EXHIBIT 4

UNITED STATES DISTRICT COURT

DISTRICT OF MINNESOTA

In Re Bair Hugger Forced Air Warming Products Liability Litigation	) Case No. 16-cv-04187

VIDEOTAPED DEPOSITION

SAID ELGHOBASHI, M.S.c., Ph.D., D.S.c.

Irvine, California

Saturday, February 10, 2018

Reported by:

JENNY S. BOOKER, CSR NO. 9237, RPR, CLR

JOB NO. 137518

February 10, 2018
12:07 p.m.

Videotaped Deposition of SAID ELGHOBASHI, M.S.c., Ph.D., D.S.c., held at AC Hotel Irvine, 3309 Michelson Drive, Irvine, California, pursuant to Notice before Jenny S. Booker, CSR 9237, RPR, CLR.

A P P E A R A N C E S:

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APPEARANCES (Continued):

BLACKWELL BURKE, P.A.
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431 South Seventh Street
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BY: PETER J. GOSS, ESQ.
BY: COREY L. GORDON, ESQ.

ALSO PRESENT:
BRENT JORDAN, VIDEOGRAPHER

IT IS HEREBY STIPULATED AND AGREED by and between the attorneys for the respective parties herein, that filing and sealing be and the same are hereby waived.

IT IS FURTHER STIPULATED AND AGREED that all objections, except as to the form of the question, shall be reserved to the time of the trial.

IT IS FURTHER STIPULATED AND AGREED that the within deposition may be sworn to and signed before any officer authorized to administer an oath, with the same force and effect as if signed and sworn to before the Court.

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IRVINE, CALIFORNIA; SATURDAY, FEBRUARY 10, 2018
12:07 P.M.

THE VIDEOGRAPHER: This is the start of DVD labeled No. 1 of the videotaped deposition of Said Elghobashi taken In Re Bair Hugger Forced Air Warming Products Liability Litigation filed in the United States District Court, District of Minnesota, Case Number 152666.

This deposition is being held at 3309 Michelson Drive, Irvine, California on February 10th, 2018, at approximately 12:07 p.m.

My name is Brent Jordan. I'm the Legal Video Specialist with TSG Reporting, Inc. The court reporter is Jenny Booker, in association with TSG. Will counsel present please identify yourselves for the record.

MR. ASSAAD: Gabriel Assaad on behalf of the plaintiffs.

MS. ZIMMERMAN: Genevieve Zimmerman on behalf of plaintiffs.

MR. THORNTON: John Thornton on behalf of the plaintiffs.

MR. GOSS: Peter Goss on behalf of the defendants.

MR. GORDON: Corey Gordon on behalf of the defendants.

MR. ASSAAD: And before we begin, I'd like to make note that the case number that you had cited is the incorrect case number. That is the MDL case number, but the case number for this specific case is 16-cv-04187.

THE VIDEOGRAPHER: Will the court reporter please swear in the witness.

MS. ZIMMERMAN: Actually, as a matter of housekeeping, we've got the subpoena as well and I'd like to go through that. So I don't care if you do it before or after.

MR. GOSS: Okay. Okay.

MS. ZIMMERMAN: What's your preference?

MR. GOSS: Might as well get him sworn now.

MS. ZIMMERMAN: Sure.

S A I D E L G H O B A S H I, M.S.c., Ph.D., D.S.c., called as a witness, having been duly sworn by a certified court reporter, was examined and testified as follows:

EXAMINATION BY
MR. GOSS:

Q. Thank you, Dr. Elghobashi. My name is

Peter Goss. We met briefly this morning. Thank you for coming in on a Saturday to accommodate our schedules and answer our questions today. There is a subpoena related to this deposition that I believe counsel would like to respond to. Why don't I just mark it as an exhibit.

MS. ZIMMERMAN: Sure.

(Exhibit 1 marked.)

MR. GOSS: Okay. That's for Gabriel.

Okay. And the subpoena has an Exhibit A that requests certain documents.

And Counsel, if you'd like to address the items requested, please go ahead.

MS. ZIMMERMAN: Thank you. And just for purposes of preserving our record, I will try to proceed through this pretty quickly. We're going to stand on many of our --

MR. ASSAAD: I think we have your copy.

MR. GOSS: Oh.

MS. ZIMMERMAN: Oh, I'm sorry. We have highlights on ours. I didn't even think about it.

MR. GOSS: Gives away my secret sauce. Okay.

MS. ZIMMERMAN: Your secret sauce on that --

MR. ASSAAD: Sorry about that.

MR. GOSS: All right. Thank you.

MS. ZIMMERMAN: So at any rate, in order to try and streamline this process, we're going to reincorporate and restate the objections that we made with respect to the subpoena that was issued to Mr. -- pardon me -- to Dr. Elghobashi last summer.

I am prepared to provide to counsel a flash drive containing documents responsive to the subpoena this morning. And I wanted to just go through briefly the specific requests that are on the subpoena on Exhibit A.

MR. GOSS: Okay.

MS. ZIMMERMAN: With respect to No. 1, the subpoena requests all documents reviewed by the deponent in anticipation of or in preparation for this deposition. We are providing on the flash drive various documents that Dr. Elghobashi has reviewed in anticipation of his deposition.

MR. GOSS: Are the documents on the flash drive organized by category that they're responsive to?

MS. ZIMMERMAN: You know, that's a good question, Counsel. Let's see what I can see. They

are organized in terms of, you know, there's a folder that says "Photographs," for example.

MR. GOSS: Okay.

MS. ZIMMERMAN: Those are the photographs that Mr. Gordon took at the hospital inspection site.

MR. GOSS: Okay.

MS. ZIMMERMAN: There's also a data file on there that has to do with the CFD.

There is a folder of invoice -- I think there's, I think, two invoices on there, a couple of articles. Nothing that's going to be surprising. And then his published article. So I don't think you'll find anything surprising --

MR. GOSS: Okay.

MS. ZIMMERMAN: -- on the list. And it should be pretty self-explanatory.

MR. GOSS: Okay.

MS. ZIMMERMAN: With respect to Request No. 2, which requests all correspondence and documents between the deponent and non-lawyers, including but not limited to notes, investigations, test results, raw data, experiments, demonstrations, photographs, videos, movies, or any other items gathered, tested, or created in the course of the deponent's

investigation of this case, we would object to the request to the extent that it intends to encroach upon attorney-client -- pardon me -- attorney work product, and also with respect to peer review protections in this case that we have all honored throughout the course of this litigation.

With respect to No. 3, the subpoena asks for copies of all the deponent's notes, whether handwritten or typed, related to the expert work he has provided in this matter. Again, we would restate that, to the extent that this is seeking attorney work product, we are objecting to that. However, to the extent that there are non-work product protected notes, we are providing those on that flash drive as well.

With respect to Request No. 4, which asks for copies of all documents provided to the deponent by plaintiff's counsel on which the deponent has made any notations, highlighting, or underlining, again, to the extent that this calls for documents that would be protected by the work product doctrine, we object on that grounds. To the extent that there are additional documents that could be responsive to this, they are on the flash drive that we will be handing over in just a moment.

With respect to Request No. 5, defense counsel asks for copies of all items which may be used by the deponent as demonstrations, exhibits, or aids in the course of his testimony at the trial of this matter. Plaintiff's counsel would say that it is not yet determined beyond previous productions and beyond what is being produced on this flash drive today what's going to be used at trial in this matter. We will be providing any such exhibits that were done demonstratives in accordance with the Court's pretrial scheduling order in the Gareis matter.

With respect to Request No. 6, which is a copy of the deponent's current rï¿½sumï¿½ and/or curriculum vitae, counsel has been provided previously with a copy of the rï¿½sumï¿½, curriculum vitae, of Dr. Elghobashi. And there is not an updated version of that at this time, though we will make sure to provide an updated curriculum vitae in advance of trial.

With respect to No. 7, the subpoena requests the deponent's engagement agreement for work on this matter performed since June 15th of 2017. Plaintiff's counsel would say that documents related to the engagement agreement have been

previously provided. There are additional documents on the flash drive that we are providing today that reflect the CFD proposal with respect to the 505 device, and we will stand on our previous objections and productions, and then also what is being submitted today on the flash drive.

With respect to No. 8, the subpoena calls for an itemized list of time, charges, and expenses for services or opinions rendered in this case after June 15th of 2017, including an itemization for services performed by others at the deponent's direction. And, again, plaintiff's counsel will stand on both previous productions and the documents that are attach -- are being provided on the flash drive today.

On to No. 9. The subpoena calls for all documents or other materials the deponent intends to show the jury in this case. Again, plaintiff's counsel will object to the extent that that is undecided, and will be producing any such documents in accordance with the pretrial order setting scheduling deadlines in the Gareis matter.

With respect to No. 10, the subpoena calls for the deponent's correspondence file, excluding correspondence with plaintiff's counsel, in

connection with this case. Plaintiff's counsel object to this request to the extent that it invades upon the peer review process, and are not providing documents in that regard.

With respect to Request No. 11, which calls for any other documents, photographs, or other material not specifically listed above on which the deponent relies for his opinions, Plaintiffs are essentially reproducing the photographs that were taken by Mr. Gordon and others on behalf of Defendants during the course of the hospital inspection in South Carolina in December. And so there are documents that will be produced on the flash drive today, and those are the only documents responsive to this.

Request No. 12 asks for all written communications, including e-mails between the deponent and the following study authors: Dr. Apte, Dr. He, Dr. Pakseresht, and Dr. Karra. Again, plaintiff's counsel object to the extent that this invades on the peer review process and relevance, and are not producing documents in this regard.

Turning to Request No. 13 in the subpoena: All communications with the journal editors and peer reviewers concerning the article, "Effect of

Heated-Air Blanket on the Dispersion of Squames in an Operating Room," plaintiff's counsel restate their objection with respect to the peer review process and the Ingelfinger rule that has been raised throughout the course of Dr. Elghobashi's testimony and the rest of the litigation in this case. Those documents will not be produced.

With respect to No. 14, the subpoena calls for any study, test, trial, experiment, research, and/or data analysis the deponent sponsored, conducted, performed, proposed, attempted, considered, discussed, planned, arranged, and/or performed on the Bair Hugger warming system or filter for use with any Bair Hugger warming system, including any work in progress. We would refer counsel to the documents being produced on the flash drive this morning and those previously produced in connection with the CFD done on the model of the 700 series.

And then finally with respect to Request No. 15, which requests all compilations of electronic data and computer files created in connection with any computational fluid dynamics analysis of the Bair Hugger patient warming system in which the deponent has participated since

June 15th of 2017, plaintiff's counsel would refer defense counsel to both the previous productions and the flash drive that is being produced this morning.

And with that, I'll turn the deposition back over to you.

MR. GOSS: Okay. I will take the flash drive, please. And because we don't have anything on paper, I may need to take a break to print a couple of things off --

MS. ZIMMERMAN: That's fine. Absolutely.

MR. GOSS: -- of it. Okay.

A couple things in response. One is I -- so I understand that there are new CFD calculations and videos being provided on the flash drive. It's the defendant's position that all work was to be completed in connection with Dr. Elghobashi's expert report in the Gareis matter by the -- November 27th of 2017. And so on that basis, we're reserving our right to review the material with our expert witness, perhaps provide a rebuttal report, and perhaps come back and ask Dr. Elghobashi more questions if we need to. We're going to do our best to get our questions answered as much as possible today. But by proceeding with the deposition, we're not waiving any of our rights.

And then just for -- just for clarification, the counsel's basis for not producing any materials relating to peer review is the Ingelfinger rule?

MS. ZIMMERMAN: And relevance. But, yes.

MR. GOSS: And relevance. Okay.

MR. ASSAAD: And work product.

MS. ZIMMERMAN: And work product, yes.

MR. GOSS: And work product?

MR. ASSAAD: Yeah.

MS. ZIMMERMAN: For some of them, yeah.

MR. GOSS: Okay. And I hate to do this because we haven't even started, but I think there are a couple of things that I'd like to see on here and perhaps print out that will actually make the questioning go a little bit faster. So if we can take a short break so that I can print these things, I'd really appreciate it. Thank you.

THE VIDEOGRAPHER: Off video at 12:20 p.m.

(Recess.)

THE VIDEOGRAPHER: Back on video at 12:28 p.m.

MR. ASSAAD: And before we begin, I just want to add something on the record. It was in addition to the response to the subpoena, I'd just like to note that the subpoena production date is

today, February 10th, 2018, at noon, for all the documents and videos and files that were requested by the plaintiff regarding Mr. -- or Dr. Elghobashi's report.

MR. GOSS: Actually requested by defendants.

MR. ASSAAD: Or defendants. My fault.

MR. GOSS: Okay.

BY MR. GOSS:

Q. Dr. Elghobashi, good afternoon. Welcome back.

A. Good afternoon.

Q. Am I right that you have not had your deposition taken since your last deposition in this case? Is that true?

A. Correct.

Q. Okay. And have you taken on any other expert witness litigation assignments --

A. No.

Q. -- since your previous deposition? Okay. Okay.

So just to remind you of the rules for the deposition, I am going to ask you questions. Full disclosure, I am not an engineer. I don't think I even took any science courses in college. Well,

maybe a couple. So some of my questions may sound ill-informed and unintelligible to you. If I ask you a question that you don't understand, please ask me to rephrase it, and I will try to do better.

A. Okay.

Q. We need to be careful not to speak over each other, because we have a court reporter here who is taking down everything that I say and everything that you say.

To have a clear record, we need to minimize the use of what I just did, which is I said "um." So you can say "um." But if a question calls for a "yes" or a "no," we need to say that rather than "uh-huh" or "huh-uh."

Is that fair?

A. Agreed.

Q. Okay. Okay. And I'm not planning to keep us here overly long today, at least that's not my intent. But if you need to take a break at any point, just let us know, and we can take a break. I only ask that if you have a -- if I have asked you a question, that you answer the question before we take the break.

Is that fair?

A. Correct.

Q. Okay. And lastly, counsel may object to some of my questions. So give him time to make his objection before you answer. And unless you're instructed not to answer the question, then you may proceed and answer the question.

Is that fair?

A. Fair.

Q. Okay. What have you done to prepare for the deposition today?

A. I did not do anything.

Q. Okay. Did you have any -- any meetings with counsel for the plaintiffs?

A. On -- on February 5, I met with counsel.

Q. Okay. And where was that meeting?

A. In John's office, John Thornton's office.

Q. And how long was the meeting?

A. Three hours.

Q. And that was for the purposes of preparing for the deposition today?

A. Correct.

Q. Okay. Other than that meeting on February 5th, have you had other meetings to prepare for today's deposition?

A. No.

Q. Have you had any telephone calls to prepare

for today's deposition?

A. No.

Q. You mentioned that Mr. Thornton was present for the meeting on February 5th. What --

A. No.

Q. What -- oh, I'm sorry.

A. No. We used the conference room --

Q. Okay.

A. -- but he was not available. I only met with counsel and with Genevieve.

Q. Okay. So Mr. Assaad and Ms. Zimmerman; correct?

A. Correct.

Q. Thank you.

Since your previous deposition, have you reviewed any articles for your work on this case, any published articles?

A. Related to this work?

Q. Yes, sir.

A. I have not.

Q. If there are articles that are in -- provided in the flash drive that I was handed, is it likely that you would have reviewed those, or do you know?

A. Which flash drive?

Q. The one I was handed this morning. There are a couple of articles.
A. If -- if you give me the name and the title of it, then I can say yes or no, but --
Q. Okay.
A. -- I don't recall.
Q. I may have to look again --
A. Oh.
Q. -- at the flash drive --
A. Yeah.
Q. -- during the break.
A. Yeah.
Q. I think one was -- the first author was Shirozu.
Does that sound familiar?
A. I -- I have not read the paper by Shirozu.
Q. Okay.
A. Yes.
Q. So would it be fair to say since your last deposition, you have not reviewed any literature on particle counting in operating rooms?
A. Correct.
Q. And you have not reviewed any literature regarding patient normothermia; true?
A. Correct.

Q. Since your previous deposition, have you reviewed any internal documents of 3M?
A. No.
MR. ASSAAD: Object to form of the last question.
BY MR. GOSS:
Q. Have you reviewed any documents --
MR. GOSS: I don't understand the basis for the objection.
MR. ASSAAD: Just vague. What's "internal documents" --
MR. GOSS: Okay.
MR. ASSAAD: -- mean?
BY MR. GOSS:
Q. Have you reviewed any documents that you understood to have come from 3M or Arizant?
A. No.
Q. Since your previous deposition, have you reviewed any expert reports prepared by any of the plaintiff's experts in this case?
A. No.
Q. Since your last deposition, have you reviewed any expert reports prepared by any of the defendant's experts in this case?
A. No.

Q. Do you know whether you have been provided any copies of defendant's experts' reports, specifically in the Gareis matter?
A. No.
Can I ask a question?
Q. Yes.
A. When you say "defendant," I don't know what you mean by "defendant."
Q. Sure. So the defendants in this case are 3M and a company called Arizant Healthcare.
Do you understand that?
A. Correct.
Q. Okay. So have you reviewed any reports prepared by experts on behalf of 3M or Arizant that you recall?
A. No.
MR. ASSAAD: You may want to clarify. I think you might be confused. He has seen Al Abraham's report, the original report.
MR. GOSS: Okay. So that --
MR. ASSAAD: You may want to use it by name, you know, because you might be thinking 3M, like 3M people.
MR. GOSS: Oh.
THE WITNESS: Okay. Yeah.

MR. GOSS: Oh, sure.
BY MR. GOSS:
Q. So for example, Dr. Abraham.
Do you know Dr. Abraham?
A. I've seen him once in the previous deposition.
Q. Okay. Other than that, you have never --
A. No.
Q. -- encountered him professionally; is that fair?
A. Never.
Q. All right.
A. Uh-huh.
Q. And at the last deposition, I believe you discussed Dr. Abraham's report.
Is that -- is that what you recall?
A. For the record, I have not read Dr. Abraham's report.
Q. Okay.
A. I have not.
Q. Okay.
A. And I think I told the site that I did not.
Q. And that's true today, you still have not read his --
A. Correct.

Q. -- report?
A. Correct.
Q. Okay. Dr. Abraham --
MR. ASSAAD: And that applies to Gareis, too.
MR. GOSS: Okay.
MR. ASSAAD: I just want to make sure we're clarifying between which report.
MR. GOSS: Well, let me just clarify that.
THE WITNESS: Okay.
BY MR. GOSS:
Q. So Dr. Abraham, like you, he prepared a report for the Gareis case which we're here to talk about today.
Have you seen that report --
A. No.
Q. -- or read it?
A. No. No.
Q. Okay.
MR. ASSAAD: I want to clarify something because there's some confusion.
MR. GOSS: Okay.
MR. ASSAAD: He did read the criticisms of Abraham's original report of him. He didn't read the CFD report.

Does that make sense?
MR. GOSS: Well, I want to hear it --
MR. ASSAAD: Okay.
MR. GOSS: -- from the witness.
THE WITNESS: Okay.
BY MR. GOSS:
Q. Do you recall reading Dr. Abraham's critique of your report?
A. I did.
Q. Okay.
A. Okay.
Q. And then did you subsequently make some corrections to your report after reading those criticisms?
MR. ASSAAD: Object to form.
THE WITNESS: You mean our report? I recall there was a typo in the figure number and a typo in the temperature value and the table. And those two were corrected --
BY MR. GOSS:
Q. Okay.
A. -- those typos. I remember that.
Q. Okay. For your report in the Gareis case, are there any typographical errors that you intend to correct --

MR. ASSAAD: Object to form.
THE WITNESS: I --
BY MR. GOSS:
Q. -- that you have identified so far?
A. I have to ask a question.
When you say "the Gareis case," I don't know what you mean by that.
Q. Okay. Sure.
A. I have no idea.
Q. So -- no, that's fine.
So to clarify, this is the report that you would have signed on -- and we'll mark a copy in a minute -- the report that you signed on November 27th of 2017, I believe.
Do you remember that report?
MR. ASSAAD: The 505 report?
MR. GOSS: The 505 report.
THE WITNESS: So 505 report that I wrote, I know it.
BY MR. GOSS:
Q. Okay. And is there anything that you want to correct in that report --
A. No.
Q. -- before we get started?
A. No.

Q. Okay. Have you seen Mr. Keen's report in the Gareis case?
A. No.
Q. So your 505 report does not contain any criticisms of Dr. Abraham; is that correct?
MR. ASSAAD: Which -- could I just clarify of his 505 report of his Gareis report?
MR. GOSS: Well, so I'm saying Dr. Elghobashi's 505 report does not mention Dr. Abraham.
THE WITNESS: Correct.
BY MR. GOSS:
Q. Okay. Do you have -- so and you have not reviewed Dr. Abraham's report in the Gareis case as of today; correct?
A. Correct.
Q. Okay. Do you intend to review Dr. Abraham's report? Do you have any plans to review it?
MR. ASSAAD: Objection to form.
Don't disclose any conversations that you have had with -- that any of the attorneys on the plaintiffs and you had. So with that caveat, you may answer.
THE WITNESS: I don't know what report.

BY MR. GOSS:
Q. Okay.
A. Therefore, I cannot make a decision on something I have not known.
Q. Understood.
So as of today, you do not have any criticisms to offer of Dr. Abraham's report in the Gareis matter; true?
MR. ASSAAD: Objection to form.
THE WITNESS: I have not seen a report; therefore, I cannot say anything about something I have not seen.
BY MR. GOSS:
Q. And that's perfectly clear. Thank you.
A. Okay.
Q. Have you read, since your previous deposition, any deposition transcripts? Any testimony provided by any experts either from the plaintiff or the defense --
A. No.
Q. -- in this case?
A. No.
Q. Since your previous deposition, have you reviewed any court hearing transcripts in this matter?

A. No.
Q. Have you reviewed any court filings by the plaintiffs or the defendants?
A. No.
Q. In preparation for your deposition today, did you review your expert reports?
A. No.
Q. So at the beginning of the deposition, we discussed -- counsel discussed the response to the subpoena. And I wanted to ask you a couple of questions. I understand that counsel has not provided any correspondence that would fall within the peer review process, including correspondence with your co-authors and with journals.
Have you -- are you able to tell me, have you had any such correspondence?
A. You mean in writing or --
Q. Electronically or anything.
A. I have seen the -- I have read the reviewer's report when the editor sent it to us.
Q. Okay. So your paper that was recently published, the first author is -- I may mispronounce this, but it's He, is that right, H-e?
A. It could be, yes.
Q. Okay. That paper was peer reviewed;

correct?
A. Correct.
Q. And you did receive comments from peer reviewers?
A. Correct.
(Exhibit 2 marked.)
BY MR. GOSS:
Q. Exhibit 2 is in front of you.
A. Yes.
Q. And I will represent to you that that is a copy of your published paper, "Effect of Heated-Air Blanket on the Dispersion of Squames in an Operating Room."
Does it appear to be a complete copy?
A. I have to check. It looks like.
Q. Okay. It should be complete.
A. Okay.
Q. All right. This article was published in the Journal of Numerical Methods in Biomedical Engineering; true?
A. International Journal of --
Q. I'm sorry. International Journal. Thank you.
A. Yes.
Q. Okay. Did you -- did you yourself submit

the manuscript to the journal?
A. The -- the corresponding author is Dr. Apte.
Q. Dr. Apte.
Do you know whether the manuscript was submitted to any other journals before it was accepted for publication in this one?
A. No.
Q. Did Dr. Apte provide you copies of what was actually submitted to the journal?
A. Yes.
Q. How do you know Dr. Apte?
A. From conferences, technical conferences. Yeah.
Q. Was Dr. Apte ever a student of yours?
A. No. He was a post-doc at Stanford, yeah.
MR. ASSAAD: I'd just like to make the record clear so we both can be on the same page here, Mr. Goss. The report here is basically the same report he did in the 750 that you guys asked on general causation.
If you want to go and ask him questions on the report, I have no problem with that, but I get the same courtesy with respect to Abraham's report when I take his deposition on Wednesday. If we

could agree to that, I'll continue any questions on this report. If you can't agree, then we're gun going to run into some issues here that we're going to either contact the Court or later at a point in time we'll just --

MR. GOSS: Okay.

MR. ASSAAD: -- ask -- I'm going to tell him not to ask any questions, because this is identical to the 750 report.

MR. GOSS: Well, that's what I wanted to ask him.

BY MR. GOSS:

Q. Because there are some differences between your report and the published article; correct?

A. When -- when you get comments from the reviewers, they will ask you to add something they don't understand. So there could be, yes.

Q. Okay. And so what I want to focus my questioning on today --

A. Yes.

Q. -- is what's different from the original report in order to minimize going over things that were discussed during the last deposition.

MR. ASSAAD: And I also get the same courtesy?

MR. GOSS: If you want to ask Dr. Abraham about changes in his paper from his original report, then yes.

MR. ASSAAD: Okay.

MR. GOSS: Okay.

BY MR. GOSS:

Q. All right. Have you -- have you ever met either of the first three authors on this paper?

A. No.

Q. Okay. They are all students of Dr. Apte's; correct?

A. Correct.

Q. Okay. And you intend to rely on this article for your testimony and opinions at trial; true?

A. If needed. I mean --

Q. Okay.

A. -- I've not been in trial before, so I have no idea --

Q. I understand.

A. -- what --

Q. I understand.

So the manuscript was not submitted to any other journals, to your knowledge; correct?

A. Correct.

Q. So it was not rejected by any other journals; true?

A. Correct.

Q. Okay. Do you know any of the editors at the International Journal of Numerical Methods in Biomedical Engineering?

A. None.

Q. Okay. Before the article was submitted, did you review the journal's submission guidelines?

A. Briefly.

Q. Okay.

(Exhibit 3 marked.)

THE WITNESS: Thank you.

BY MR. GOSS:

Q. Exhibit 3 is something I printed off the website for the International Journal for Numerical Methods of Biomedical Engineering.

Do you see where it says "Author Guidelines" about halfway down the page? Check doc

A. Oh, yes.

Q. Okay. Does this look like what you would have reviewed prior to the submission of the article to the journal?

A. Yes.

Q. Okay. Under "Author Guidelines," it says

"Manuscript Submission." Check document. And the second paragraph says: "Authors are requested to disclose any conflict of interests, and these must be declared during manuscript submission."

A. Correct.

Q. Okay. Do you know what information, if any, Dr. Apte provided to the journal regarding any conflict of interest related to this article?

A. No.

Q. And if you will turn to Page 34 of the article. Do you see where it says "Conflict of Interest"?

A. Yes.

Q. Okay. And it says: "Authors have no conflicts of interest to declare." Check document.

A. Correct.

Q. Okay. Is it your understanding that there are no conflicts of interest to declare --

MR. ASSAAD: Objection.

BY MR. GOSS:

Q. -- with respect to this?

MR. ASSAAD: Objection to form.

THE WITNESS: I'm not a lawyer. I don't know what you mean by question.

///

BY MR. GOSS:
Q. You don't know what I mean by "conflict of interest"?
A. Correct.
Q. Okay. Do you normally, in your published work, disclose the funding sources for the work that you do?
A. If it's required by the journal.
Q. Did you have any conversations with Dr. Apte about whether there needed to be a disclosure of the funding source for this article?
A. No, never.
Q. Okay. Did you have a conversation with anyone other than Dr. Apte --
A. No.
Q. -- about disclosing the funding source?
A. No.
Q. Do you think readers of this article would want to know the funding source for the work described in the article?
MR. ASSAAD: Objection to form.
THE WITNESS: I have no idea.
BY MR. GOSS:
Q. All right. The work described in the article was paid for by plaintiff's counsel;

correct?
A. I couldn't hear you.
Q. I'm sorry.
The work described in the article was funded by plaintiff's counsel in this case; correct?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. I'll ask you.
What is the funding source for the work described in this paper?
A. From the counsel --
Q. Okay.
A. -- corporation. Yes.
Q. And based on your understanding of "conflict of interest," you do not consider that to be a conflict of interest; is that right?
MR. ASSAAD: Objection to form.
THE WITNESS: No.
BY MR. GOSS:
Q. Okay. Did you perform any of the calculations that are described in the article?
MR. ASSAAD: Objection to form.
THE WITNESS: I prescribed the boundary conditions in detail --
///

BY MR. GOSS:
Q. Okay.
A. -- and all the output or needed information and then I -- they run the code.
Q. So you prescribed the boundary conditions.
Did you perform calculations to determine the boundary conditions?
A. I did.
Q. Okay. Are those calculations described in the article?
A. They are in separate reports --
Q. Okay.
A. -- that you probably have.
Q. So they're in separate reports, but not in the article; correct?
A. I'd have to read the article to see where those --
Q. Okay.
A. We use the standard to put boundary conditions in the article. Yeah.
Q. Okay. But the calculations that you perform to determine the boundary conditions, do those appear in the published article? And you can look if you would like or need to.
MR. ASSAAD: Objection. You're getting

into general causation that could have been asked during the original deposition. I'm letting -- I'll let you ask him these questions about boundary conditions that should have been discussed, but I want the same opportunity with Abraham.
MR. GOSS: Well, last time he said he didn't perform calculations. That only showed up in the errata report, and that's why I'm asking.
MR. ASSAAD: Well, then you can show him the errata report, but you've got to be more specific, then, so it's just the calculations --
MR. GOSS: Okay.
MR. ASSAAD: -- because he did do calculations.
BY MR. GOSS:
Q. All right. So do you recall preparing a report after your deposition that contained certain calculations in it?
A. Yes.
Q. Okay. Are those calculations described in the published article?
A. It may not be or...
MR. ASSAAD: You could review it, if you want.
THE WITNESS: Yeah, yeah, sure.

In general, you don't have space in a paper to write the details of how you obtain boundary conditions. So they would be mentioned, necessarily, but not how you got them.

BY MR. GOSS:

Q. Okay. This is a general question, but I'm going to try to make it as specific as I can.

A. Okay.

Q. The published article, I understand that you made certain changes in response to reviewer comments.

A. Yes.

Q. Were any of the calculations changed, that you recall?

A. Never.

Q. No?

A. Never.

Q. We spoke about a couple of typographical errors that you corrected following your -- or before your deposition last time; correct?

Other than the changes for those typographical errors, did you make any other changes to the manuscript before it was submitted to the journal?

A. Never.

Q. So the changes that were made to the manuscript all happened post-submission; is that true?

A. Due to the reviewer's comment --

Q. Okay.

A. -- yes.

Q. Were there any comments from reviewers that you did not incorporate into the final article?

A. The reviewer's comments were simple.

Q. Okay.

A. We did everything they wanted.

Q. In your published papers, do you typically include a section with acknowledgments for who supported or provided information?

A. Correct.

Q. Okay. There's no acknowledgments section in this article; correct?

A. Correct.

So in general, our research is supported by government agencies, NSF, DOE, NASA. And they require, when you get a grant, to acknowledge them when you publish.

Q. Okay.

A. That's all.

Q. And you did not have any such requirement

related to your work --

A. Correct.

Q. -- in this case?

A. May I make a comment to help you?

Q. You certainly may.

A. I told counsel before we started, if our results show that the Squames would not go up to the location of the OR table, we will publish the work for the students regardless of the result.

Q. Okay.

A. So this is not make a results to help somebody. I told them -- you can ask them individually afterwards. I told them, if no Squames are lifted, we will publish it.

Q. So the plan was to publish the results of the CFD no matter what?

A. Exactly.

Q. Okay.

A. Because the students work for six months to do that. In general, we do not publish things to help some other reason.

Q. Okay.

A. Just like it's a science.

(Exhibit 4 marked.)

///

BY MR. GOSS:

Q. Exhibit 4 is an article that I found on the Internet about the published paper.

Were you interviewed for this article?

A. No.

Q. You can take your time to look at it, if you need.

A. (Witness perusing document.)

Where did you get from?

MR. ASSAAD: From Oregon State?

BY MR. GOSS:

Q. I think it originally came from Oregon State. In fact, on that back page it says: "Provided by Oregon State University."

A. Okay.

Q. Okay. Have you seen this before? Check document.

A. I -- it's -- can I -- is that the interview?

MR. ASSAAD: Of Apte?

THE WITNESS: Yes.

MR. ASSAAD: Yes.

THE WITNESS: Oh, then I've seen it then before but after it happened, yeah.

///

BY MR. GOSS:
Q. Okay. So you were not interviewed --
A. No.
Q. -- for this story?
A. Never.
Q. All right. At the -- just turning to the very last paragraph.
A. Yes.
Q. It says: "The numerical approach lacks any limitations from a theoretical point of view, but there is a lack of detailed experimental measurements of the 3D velocity field in an operating room during a clinical trial."
And that's what Dr. Apte said; correct?
A. Correct.
Q. Okay. He goes on to say: "Such data would help validate the numerical predictions."
Do you agree with Dr. Apte's statement that it would --
A. It's a general statement to all CFD, yes.
Q. Okay. That experimental measurements --
A. Yes.
Q. -- would help validate the predictions?
A. Correct.
Q. Okay. And then it says: "According to

experts in fluid flow measurements, gathering such detailed data during a clinical trial is potentially feasible but may cost up to $2 million check document."
Do you know what the source of that information is for --
A. It's me.
Q. Okay. I thought it might be.
A. Yeah.
Q. That's why I was asking.
A. It is me, yeah.
Q. Okay. So -- and what is the basis for your statement that conducting detailed experimental measurements of the 3D velocity field --
A. Correct.
Q. -- may cost up to $2 million?
A. Okay. So here, what it would take to produce detailed experimental data to validate LES, first you need access to an actual operating room for three months --
Q. Okay.
A. -- in a real operating room. Nobody should go in there.
Q. So "nobody should go in there," meaning that you would be -- you're taking measurements with

no one actually present in the room?
A. No. I meant nobody will touch the equipment for two months, because, first, it's a PIV camera, 3D.
Q. Okay.
A. The whole room will be all laser equipment and under actual condition before people go in. And this will take a long time to get the velocity field without a blower, repeat the same thing with the BH blower on. And then if you want to get fancy, you put four people and do the same thing. That's only about velocity.
For temperature, this is called nonintrusive. Means you don't put your finger in. It will be only laser equipment tracking certain particles to get the velocity field, 3D.
Q. Okay. And you said something about temperature.
What about for temperature?
A. For temperature, you have to hang the thermal couples from the ceiling at different heights to get the 3D temperature field. Not somebody with an anemometer or going by hand or schlieren, all this junk, no. It has to be done this way. That will cost about $2 million.

Q. Okay.
A. Yeah.
Q. You just referred --
A. Not -- not including -- not including the rent of the operating room itself.
Q. Okay. And that adds up to $2 million?
A. Yeah. In a conservative way, yes.
Q. All right. I think you just referred to schlieren images as junk.
Did you mean to say that?
A. To measure temperature in an operating room under these conditions, schlieren would give you zero --
Q. Okay.
A. -- nothing. It will give you density gradients around a candle or a flame or something. I did that in my -- my undergraduate work.
Q. Okay.
A. I'm talking about 3D point -- point velocity temperature. You cannot do that except as I explained.
Q. So would you agree that schlieren imaging is only junk, as you put it, when applied to this purpose?
MR. ASSAAD: Objection to form.

THE WITNESS: Would not give you quantitative data that I need to compare with our simulation results. I need T at the given X, Y, Z.
BY MR. GOSS:
Q. Okay.
A. That will not get from schlieren. Schlieren only give you nice pictures.
Q. Okay. Schlieren only goes as far as it goes; fair? It's within the limits of the schlieren technique, you're saying that what you need is beyond the limits of the schlieren technique?
A. Absolutely.
MR. ASSAAD: Objection to form.
THE WITNESS: Yes.
BY MR. GOSS:
Q. I'm just trying to understand --
A. Yeah.
Q. -- your testimony.
A. Yes.
Q. So -- okay.
MR. ASSAAD: Do you want to spell schlieren for the court reporter, because I'm sure she --
MR. GOSS: Oh, I can do that, sure. I think I can do it. S-c-h-l-i-e-r-e-n.
THE REPORTER: Thank you.

MR. GOSS: Schlieren.
BY MR. GOSS:
Q. Okay.
MS. ZIMMERMAN: And, Pete, just for the record, I tried to e-mail her a copy of one of these reports for spelling purposes.
MR. GOSS: Oh, okay.
MS. ZIMMERMAN: But I haven't provided her everything. It was only one document that was easy.
MR. GOSS: Oh.
MS. ZIMMERMAN: So you might want to send some others just so she has something to refer to.
MR. GOSS: Oh, yeah. We're going to mark stuff --
MS. ZIMMERMAN: Yeah.
MR. GOSS: -- so we'll have it.
MS. ZIMMERMAN: A sense ahead of time so the reporter knows what the spellings are.
MR. GOSS: No problem.
BY MR. GOSS:
Q. Returning to your published article, if you'll turn with me to page 6, please.
A. 6?
Q. Yes, sir.
Okay. Just past references 27, 29?

A. Yes.
Q. And 28?
A. Yes.
Q. It says at the time of writing this paper check document, only one LES study has been published for an operating room. And then there's reference 30 check document, which, I believe, is the S paper check document?
A. Yes.
Q. Is that correct?
A. Uh-huh.
Q. Are you aware that Dr. Ab has published a paper of an LES study done in an operating room?
MR. ASSAAD: Objection to form. Misstates facts.
BY MR. GOSS:
Q. Are you aware of Dr. Ab's paper?
A. I was told he published a paper.
Q. Okay. It was published in August of 2017. Have you seen the paper?
A. I think I've seen it once.
Q. Did you have any discussion with Dr. Apte about whether that reference should be included in your published paper?
A. I have not.

Q. Okay.
MR. ASSAAD: I'd just like to clarify what dates you're referring to because as of the time of writing this paper this is part of his 750 report.
MR. GOSS: Okay.
MR. ASSAAD: The published -- the published paper was way after that, after he wrote this report that ended up being submitted and published -- and published.
MR. GOSS: Right.
MR. ASSAAD: So I don't want any misleading dates here.
MR. GOSS: Sure.
BY MR. GOSS:
Q. So the Abraham paper was published in August of 2017. And this paper was published in January of this year; correct?
A. It was submitted much earlier.
Q. Okay.
A. So at the time of sending it to the editor.
Q. Yes?
A. That other paper was not there.
Q. Right. But you would have had the opportunity to include an additional reference during the review process; true?

MR. ASSAAD: Objection to form.
THE WITNESS: You want me to be Frank with you?
BY MR. GOSS:
Q. I do. I want you to be as truthful as possible.
A. So paper by Abraham, I call junk.
Q. Okay.
A. The reason is it has nothing. It has nothing.
Using answers to push buttons to create color picture for one second, this took years of work -- what you see here took many years of work to produce accurate large simulation. So if I'm talking to a person on my level would refer to what Abraham did is absolute junk.
Q. Okay.
A. I'm Frank with you.
Q. So you do not consider Dr. Abraham to be?
A. Never.
MR. ASSAAD: Let him finish the question.
THE WITNESS: Sorry.
BY MR. GOSS:
Q. One at a time I understand what you're saying?

A. I'm sorry.
Q. Yeah. So you do not consider Dr. Abraham to be at your level; correct?
A. I couldn't hear you.
Q. You do not consider Dr. Abraham to be a researcher at your level; true?
A. Definitely not my level, but definitely not at the level of that paper.
Q. Okay. And is that why you did not include that reference?
A. No.
Q. In this article?
A. No. We -- no. We refer to something that is important for the reader to understand this paper.
Q. Okay?
A. Usually use references to say I use this equation because it was written by somebody else. So to -- the paper has to be very clear and therefore we rely on references that we trust.
Q. Okay.
A. Okay.
Q. So -- and the reason that you did not include Dr. Ab's paper in this article, or revised manuscript to include it, is that you do not trust

his paper is that true?
A. Absolutely.
Q. Okay.
A. I'm being frank with you.
Q. Yes.
A. But I'm sorry to say that, but it's a fact.
Q. I understand.
MR. ASSAAD: Objection to form to the last question -- last couple of questions.
BY MR. GOSS:
Q. Do you understand that ab's paper was, in fact, based on a large eddy simulation?
A. The name, yes. The name LES, large eddy simulation -- but, yes.
Q. Okay.
A. Just for the name only.
Q. Turning to page 13?
A. 15?
Q. 13.
A. Oh, I'm sorry. My hearing is not good.
Q. It's okay.
Okay. There are seven studies discussed on this page; correct?
A. Yes.
Q. Okay. And these studies were mentioned

in your previous report, but I don't think they were all collected in this same place; is that true?
A. Correct.
Q. Okay. These seven studies, what I wanted to ask you about them is: Do any of these studies involve airflow in a room?
MR. ASSAAD: Objection to form.
THE WITNESS: No.
BY MR. GOSS:
Q. Okay. Do any of these studies involve a flow that lasts longer than one second?
A. Certainly.
Q. Okay. Which ones?
A. I have to look. No. -- No. 4.
Q. Do you remember how long the flow was in that study?
A. I have to look at the paper itself.
Q. Okay. But in any event --
A. It was a long time ago.
Q. Okay. But your recollection is that paper No. 4 --
A. Because -- because when you say air combustion chamber in a jet engine.
Q. Yes.
A. It takes much more than one second.

Q. More than one second?
A. Absolutely.
Q. Okay. How long does that typically take?
MR. ASSAAD: Objection to form.
THE WITNESS: I have to go back to the paper to give you an accurate answer.
BY MR. GOSS:
Q. Okay. But more than one second?
A. Certainly.
Q. Okay. Any other flows lasting more than a second?
A. Six. The paper on item six. 7, 2, 3. Yeah, the first one is just -- I was just Taylor Green in the first one I just read the title check document. Okay.
Q. Okay. So other than papers 1 and 5, all of these papers involve flows lasting longer than a second; true?
A. 5 also, yes.
Q. Oh, 5 does, too?
A. Yes. It's only one that's --
Q. It's only one that --
A. Yes.
Q. Okay. Turn to page 27, please. There's a discussion on page 27 at the top of "Limitations."

Do you see that?
A. Okay. Yes.
Q. All right. Did you write the two paragraphs here that discuss limitations?
A. I would like to read to remember.
Q. Certainly.
A. I discussed with Apte, yes.
Q. Okay. So you and Dr. Apte collaborated on these two paragraphs; is that fair?
A. Correct.
Q. All right. In the first paragraph, the article says in the present study, several other complexities involving other medical equipment check document in an operating room, motion of medical staff, opening and closing of the OR door, among others, are not accounted for. However, these complexities may not impact the main conclusions of the present study.
And I wanted to ask you about that last sentence. What's your basis for saying the complexities that aren't in the model may not impact the main conclusions?
A. So the main -- the main goal of the study was you have an operating table, a patient, and four medical staff, and a bed H check check. Any

equipment other than this in the room far away from computers or anything would not affect this, because the main flow in the room was ten grilles above the operating table and the Bair Hugger on the floor.
Q. Okay.
A. Any other peripheral equipment would not affect this.
Q. But the peripheral equipment is not included in your model; correct?
A. Correct.
Q. Okay. And can you really say what effect it would have without it being in the model?
MR. ASSAAD: Objection to form.
Before you answer --
You're getting into general causation questions, I'm going to instruct him not to answer unless you can give me the agreement that I can go back to Abraham's original model and talk about what's in the original model.
MR. GOSS: I'm talking about something that's new in his article. This was not in the general causation.
MR. ASSAAD: It was asked in his general causation.
MR. GOSS: I don't think this sentence

existed.
MR. ASSAAD: No. You talked about other people in the operating room. The effects of other things in the operating room.
MR. GOSS: Okay.
MR. ASSAAD: Even though it's written here, it's been discussed the general cause.
MR. GOSS: Okay.
MR. ASSAAD: I'm happy to have him answer, but I want the same leeway.
BY MR. GOSS:
Q. With your new calculation with the 505 all right, let's take this statement in the context of that new calculation.
Can you say the effect that equipment not included in the model would have on the results without actually having it in the model and performing the calculation?
MR. ASSAAD: Objection to form. Vague as to a specific type of equipment.
BY MR. GOSS:
Q. Do you understand my question?
A. I do.
Q. Okay.
A. And based on my experience for 40 years in

this, I know what turbulence does near an operating table. If you put a computer or a lamp far away from this, it will impact the local conditions. But the main eddies from coming from the ceiling would not be affected. Would be a minor. I am -- this is based on my experience -- we've done many flows like that.

Q. So, now, what the article says is these complexities may not impact the main conclusions of the present study.

Are you saying today that they will not impact the main conclusions of the --

MR. ASSAAD: Objection to form.

THE WITNESS: When you write a journal paper that will be open to a thing, you'll always be overconservative.

BY MR. GOSS:

Q. Okay.

A. You don't want to be saying, "I'm the hero of this." But I'm telling you right now, it will be very minimal.

Q. Okay.

A. We could not do that.

Q. The last paragraph covers some of the same information that we've already discussed about

experimental --

A. Uh-huh.

Q. -- validation.

The second-to-last sentence says: "In addition, thermal couple measurements characterized in the temperature field in the OR are necessary" check document; correct?

A. Correct.

Q. And you testified about that earlier, that you would want to take thermal couple measurements as part of the experimental data collection?

MR. ASSAAD: Objection to form. Misstates his prior testimony. He talked about placing thermal couples.

MR. GOSS: Okay. I just was trying to provide some context.

BY MR. GOSS:

Q. Are you aware of any published studies that have placed thermocouples in this different parts of an operating room to measure temperature?

A. I may have read one, but what I answered earlier was about hanging a network of thermocouples in different elevation, different location, to make a network.

///

BY MR. GOSS:

Q. Yes.

A. Not intrusive. That's the right way.

Q. Okay.

A. If it has been published somewhere, that's fine, but this is what is needed here.

Q. Okay. And so my question just was: Have you seen a published paper describing an experiment where thermal couples were placed in an operating room with a Bair Hugger?

A. With a Bair Hugger?

Q. Yes, sir.

A. No. No.

Q. Okay.

(Exhibit 5 marked.)

BY MR. GOSS:

Q. Okay. This is Exhibit 5. And, Dr. Elghobashi, is Exhibit 5 a copy of your proposal for the 505 CFD?

A. Yes.

Q. Okay. And it's dated November 11th, 2017; correct?

A. Correct.

Q. When were you asked to perform the calculation with the 505 blower?

A. Before that date, but I don't recall exactly.

Q. Would it have been weeks before? Can you estimate?

A. I used to go to my calendar. I have a computer calendar that can tell me.

Q. Okay.

A. Yes. I don't know.

Q. And so the computer calendar would have a date on it reflecting a conversation you had with counsel about the new study; is that right,

A. Maybe. Yes, maybe.

Q. Okay. Would you have been approached -- do you recall whether you discussed this 505 calculation with counsel before October of 2017?

MR. ASSAAD: October 31st or October 1st?

MR. GOSS: Just anytime in the month of October.

MR. ASSAAD: Objection to form.

If you recall.

THE WITNESS: I have to look at my --

BY MR. GOSS:

Q. Okay.

A. Yeah. I have so many things.

Q. I understand.

A. Yeah.
Q. What's your understanding of why you were doing a new calculation with the 505?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. If you have one.
MR. ASSAAD: Same objection.
THE WITNESS: I was not given detail, but I was asked if the low flow rate machine, the BH, would produce the same results as the 750.
BY MR. GOSS:
Q. Okay. And you, in fact, offered an opinion that it would in your general causation report; correct?
A. Yes.
Q. And so the goal here was to actually do the calculation to confirm that opinion; is that right?
A. Correct.
Q. Okay. So it says the operating room description, the operating room geometry and contents will be identical to those used for the earlier simulation that used the model 750 check document.
Is that correct?
A. Yes.

Q. Okay. And then it says check document: The only changes that will be made are, No. 1, the airflow -- the air volume met I can flow rate for the blower, model 505, equals 30 cubic feet per minute instead of the earlier 44.5 cfm for the model 750; correct?
A. Correct.
Q. Where did you get the 30 feet per minute flow rate for the model 505? Was that provided by counsel?
A. Provided by counsel.
Q. And, No. 2, check document the second change is the temperature of the heated air leaving the perforated side of the blanket equals 40.5 Celsius instead of the earlier 41 Celsius for the model 750; correct?
A. Correct.
Q. And where did you get the value of 40.5 Celsius for the 505?
A. Either from counsel or from 3M specification page. I'm not sure which one. But --
Q. Okay.
A. -- yeah.
Q. And you indicate that two simulations will be performed. No. 1, a simulation will be performed

check document with the blower reduced flow rate for about 45 seconds. Earlier we used about 30 seconds; correct?
A. Correct.
Q. To reach steady state of the turbulent flow without Squames check document.
The second simulation is to track the trajectories of 3 million Squames for another 35 to 40 seconds.
And I take it that is beyond the initial 45 seconds --
A. Correct.
Q. -- needed to reach steady state; is that true?
I'm sorry. Your answer?
MR. ASSAAD: Answer.
THE WITNESS: Oh, sorry. I was reading --
BY MR. GOSS:
Q. "Yes"?
A. -- down here. I'm just reading again, please.
Q. Okay. So my question was just to make sure I understand correctly --
A. Uh-huh.
Q. -- that the Squames simulation would track

trajectories for another 35 to 40 seconds after the blower reached stead state as described in Item 1; true?
A. I have to read again, please.
Q. Okay.
A. (Witness perusing document.)
Correct. What's written is correct.
Q. Okay. The deliverables is a technical report describing the results. Check document.
And did you generate or draft a technical report describing the results of this --
A. Not yet.
Q. Not yet.
Are you -- are you working on the technical report?
A. Correct.
Q. Okay. When do you expect to have the technical report ready?
A. I -- I have to think because I have many trips to make, so I -- within the next three to four weeks.
Q. Okay. I understand you've had many trips already this year; is that right?
A. Right. Right.
Q. Okay.

A. I was -- yeah.
Q. I need to ask: Do you plan to take a trip to Minnesota in May of this year?
A. I -- I was told a few days ago by counsel it could be sometime in May and I'm still teaching in the spring quarter. So I -- I teach in the spring I teach Monday and Wednesday, and I was hoping to something Friday so I don't miss class but if it's necessary I will have to change.
Q. Okay.
A. Yeah.
Q. So you're still working out with counsel your arrangements to testify at trial; true?
A. They just mentioned dates. We never discussed anything. Yeah. Yeah, we're concerned with this deposition first.
MR. ASSAAD: Just instruction. Any conversations we have, please don't discuss with counsel.
THE WITNESS: Okay. Okay.
MR. ASSAAD: Nothing important so far, but --
BY MR. GOSS:
Q. Yeah. Yeah, I'm not trying to pry into strategy. I just want to know, can we expect to see

you at the trial of the Gareis matter?
MR. ASSAAD: Don't answer that question. I instruct him not to answer.
MR. GOSS: Okay.
MR. ASSAAD: It goes into our strategic plan.
MR. GOSS: Okay.
BY MR. GOSS:
Q. The second deliverable is a video showing the trajectories of the Squames in 3D check document in addition animation of temperature contours in specific planes within domain will also be provided to visualize the transport of heat within the operating room.
Did I read that correctly?
A. Correct.
Q. Okay. And I saw that among what I've been -- the files that I've been provided today, there are some PowerPoint presentations that have embedded video.
A. Correct.
Q. Okay. And are those videos that you created?
A. Correct.
Q. All right. And those are based on the

results of the calculation with the 505 blower?
A. Correct.
Q. Was Dr. Apte involved in running the calculation for the 505 blower?
A. Definitely, yes.
Q. So -- let's see. So according to --
MR. ASSAAD: Objection to form. The reason why I'm objecting, when you say "running the calculations," like he actually did the calculations himself. So that's why I'm objecting.
MR. GOSS: Okay.
MR. ASSAAD: It's kind of like he didn't actually do the calculations.
BY MR. GOSS:
Q. Yes. These calculations would be very difficult to do by hand, as I understand it?
A. Impossible.
Q. Okay. So Dr. Apte took -- let me ask you: Am I right that you provided the new changed boundary conditions to Dr. Apte and then he ran the CCode --
A. Yes.
Q. -- is that --
The schedule of the project says that it will take approximately seven weeks. Start date of

December 1st is anticipated with the deliverables due on January 20th, 2018; is that correct?
A. Correct. Check document
Q. All right. Do you know what super computer Dr. Apte used for this calculation?
A. Yes.
Q. Which one?
A. Stampede at university of Texas at Austin.
Q. Is that the same super computer that you used last time, or is it different?
A. Correct.
Q. Okay. Did you have or did Dr. Apte have any difficulty getting access to the stampede super computer?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. If you know.
A. Dr. Apte has already access --
Q. Okay.
A. -- to the computer.
Q. So is he able to access the computer whenever he needs?
A. Yes.
Q. Okay. Under "Cost," it says: The total cost of completing the above tasks is $29,000

check document; correct?
A. Correct.
Q. The previous project cost $120,000 --
A. Correct.
Q. -- is that right? All right.
So what accounts for the lower cost in this case?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. If you know.
A. It takes a long time to specify the geometry.
Q. Okay.
A. The mesh, the grid, boundary conditions. That takes most of the time.
Q. And so that work was already done, so it took less time this time --
A. Correct.
Q. -- is that correct?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Okay. So, in other words, you didn't have to rebuild the mesh and the geometry; is that right?correct.
Q. Of the $29,000, how much of that was --

represents the cost of accessing the stampede computer?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. If you know.
A. Nothing.
Q. Okay. So is the $29,000 -- is that simply the consulting fee for doing the work?
A. For students, for -- yes.
Q. Okay. So how much of the -- of the $29,000 would go to Dr. Apte?
MR. ASSAAD: Objection to form.
THE WITNESS: I -- most -- most of it, I think.
BY MR. GOSS:
Q. Okay. So that the checks from plaintiff's counsel, are they -- are the checks written to you?
A. Correct.
Q. Okay. And then you disperse funds to Dr. Apte; is that correct?
A. Correct.
Q. All right. And so you're saying that -- so in this case, there were two equal payments of $14,500?
A. Correct.

Q. And when you receive that check, you -- how much of that 14,500 do you forward to Dr. Apte?
A. I -- I have to check, but it could be I kept 2,000 for my time --
Q. Okay.
A. -- on doing -- probably. We received one check, not two.
Q. Okay. So the second check is pending after delivery of the final report --
A. Correct.
Q. -- is that --
And because the final report is not yet available, the check is not yet due?
A. Correct.
Q. Have you separately is -- separate from this project, have you -- well, hold on.
I think my question gets to invoices, which I can actually look at during a break. So rather than ask you blind, I'm going to look at the invoices on that.
But in general, have you paid -- have you been paid for your time in consulting on the case to date?
A. Today for this meeting today?
Q. No, sir. Not -- excluding today's work.

A. Oh, okay.
Q. But before today, have you been paid for all of your work in this case?
MR. ASSAAD: Objection to form.
THE WITNESS: Yes. Per hour, I give an invoice and they will pay me, yes.
BY MR. GOSS:
Q. Okay.
A. Yes.
Q. You don't have any outstanding invoices, in other words --
A. No.
Q. -- is that right? Okay?
MR. ASSAAD: This will be a good time for a break, if you're done with this document.
MR. GOSS: Let's see. I think I am, so that's that's fine.
MR. ASSAAD: All right.
MR. GOSS: Let's take a break.
MR. ASSAAD: Take a break.
THE VIDEOGRAPHER: Off video at 1:43 p.m.
(Recess.)
THE VIDEOGRAPHER: Back on video at 1:54 p.m.
///

BY MR. GOSS:
Q. Dr. Elghobashi, when we left off, we were discussing the model 505 --
A. Yeah.
Q. -- calculation.
MR. ASSAAD: Proposal, you mean?
BY MR. GOSS:
Q. The proposal and some details about how the calculation was conducted.
When was the calculation completed?
MR. ASSAAD: Objection to form.
THE WITNESS: Late January/early February, perhaps.
BY MR. GOSS:
Q. Okay. And when did you create the videos?
A. So when the computations finish, the videos are created at the time.
Q. Okay. This is where I may reflect some ignorance.
Is there software that takes the CFD results and creates the videos from it?
MR. ASSAAD: Objection to form.
THE WITNESS: So the super computer works this way: You submit a job. Creates results. And in different format. So you -- the user will store

the data in a certain format such that the super computer can create a video later on.
BY MR. GOSS:
Q. Okay. So the video files that are embedded in the PowerPoint, were those created by the super computer?
A. Absolutely.
Q. Okay. So when you received the results of the calculation, you received the videos at the same time?
A. Correct.
Q. Did anyone help you prepare the PowerPoint slides --
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. -- other than counsel?
MR. ASSAAD: Objection to form.
THE WITNESS: The -- Dr. Apte and his students create the PowerPoint with the videos, and they send it to me for review.
BY MR. GOSS:
Q. So the results from the super computer went to Dr. Apte first; is that right?
A. Correct.
Q. Okay. And then do you recall when you

received the PowerPoint from Dr. Apte?
MR. ASSAAD: Objection to form.
THE WITNESS: I have to look at my calendar, but it could be end of January/early February.
BY MR. GOSS:
Q. How long did you take to review the PowerPoint?
A. A few hours.
Q. Did you have any revisions to the PowerPoint that you then sent back to Dr. Apte?
A. No.
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. So how soon after you received the PowerPoint from Dr. Apte did you then forward the PowerPoint files to counsel?
A. A day later.
Q. Do you recall what date you would have sent those files?
MR. ASSAAD: Objection to form.
THE WITNESS: Don't have good memory. All computer I look at that.
BY MR. GOSS:
Q. Okay.

A. Calendar, yes.
Q. So the date -- if you were to look at your computer calendar, you might be able to resurrect the date; is that right?
A. Resurrect the date, not the data. The date.
Q. The date?
A. The date, yes.
Q. Okay. During the break, I looked at the flash drive --
A. Yes.
Q. -- for other invoices.
A. Yes.
Q. And there were no invoices other than the 505 project proposal.
Since your last deposition, have you submitted in any invoices to plaintiff's counsel?
A. No.
Q. Okay. Are you able to estimate the total amount of your consulting fees for your work on this case?
A. Since what date? Or for everything?
Q. For everything.
A. Again, I have to go to the computer.
Q. Okay.

A. Yeah.
Q. When a super computer generates results from the job does it generate just one file, or are there other files?
MR. ASSAAD: Objection to form. You would have thought it was a good objection, too.
BY MR. GOSS:
Q. Go ahead.
A. Okay.
Q. If understand you understand my question.
A. Sure, I do. So before submitting a run, you know in advance which planes in the room you want pictures on.
Q. Okay.
A. How many to create a video, you need many sequences at each micro second.
Q. Yes.
A. To great 10,000. Them. So you -- you tell the computer store this data when you're finished. Then when it's done, you have this file then you put software and you create a video. So you know in advance because these files are many gigabytes. Hundreds of gigabytes. And you cannot transfer them over the phone line or Internet. Everything is done at the super computer.

Q. Okay.
A. And -- yeah.
Q. So can you please explain for me what a time step is?
A. Sure. Maybe --
MR. ASSAAD: Objection to form.
THE WITNESS: Can I -- can I use the board to write? Because --
MR. ASSAAD: Sure.
MR. GOSS: Do we want to try to pull it into the video.
THE WITNESS: No, no, no, no, no. You want -- no. I was going to -- you wanted what a time step is.
BY MR. GOSS:
Q. Yes. Yes, sir.
A. So --
Q. Just for the benefit of --
A. Yeah.
Q. -- anybody who sees the video.
A. It's much easier, because --
Q. Sure.
A. -- it's nothing to do with the video -- nothing to do with the result already. It has to be done before; right.

Q. Okay. So you figure out the time steps before you submit the job --
A. Absolutely.
Q. -- to the super computer?
A. Yes. Actually, it's written in the report and the paper.
Q. Okay.
A. Do you want me to do it or not necessary? It's -- I show an equation.
Q. Yeah, please.
A. We saw something Navier-Stokes equations.
Q. Yes.
A. And they look something like this, but it's a lot of (indicating). So this is U is velocity. T is time. And this is acceleration velocity of our time and acceleration.
Q. Okay.
A. So this is the equation itself, plus many other terms. This is the first term. The other one will look like this (indicating). Something like this. And this is just a simple term that says how does the velocity at the given point in the room changes every time.
Q. Okay.
A. This equation cannot be solved by hand.

It's Navier-Stokes. Nobody can solve, nobody. So we take this and descretize. So this one will say "U" -- "i" means -- so -- okay. XY -- 3D. So XYZ coordinates. So "i" here means -- Einstein means three velocities. "U" in this direction, "V," and "W."
So the i --
Q. Can I get the "i" again for the benefit of the court reporter?
A. "I" is referring to these coordinates (indicating). So --
Q. Okay.
A. -- instead of writing three equations for each direction, Einstein, because he worked on many equations, he said, "Let's do these notations." Much easier.
Q. This is Einstein?
A. Einstein, yes.
Q. Okay. The one that we all know.
MS. ZIMMERMAN: The one with the hair?
MR. GOSS: Thank you.
BY MR. GOSS:
Q. So if you now cannot do that by hand means analytically on a pencil let's say this you can do by hand A plus B equals 3. A equals 1 therefore B

equals two that's analytical you need a computer to do that?
Q. Sure.
A. This one cannot. Nobody.
Q. Okay.
A. So we take this and descretize it when we make the mesh like this.
Q. You said "descretize"?
A. Yeah, descretize.
Q. Okay.
A. And so let's just say this is a place in the room near the table. And each node will have a name. This will be -- total will be a billion points. A billion because it's in 3D you have; right? So you take this term, and you will say I want to say how the velocity changes at this node for the next time. So you will say Ui at time itself N plus 1 minus Ui to the power and divided by Delta T. That's a time step. You see that's what I came from.
Q. Okay.
A. So that time step has to be short enough. So when the flow comes here and leaves here, you capture everything. So let us say the velocity here to here is 1 meter per second. And the thing is

1 centimeter it will take so many seconds so you want to resolve it you have to divide this into many small meshs and also the time to capture.
Q. Okay.
A. If you take a big Delta T, you will cover the whole thing. You have nothing. It will be like all mush.
Q. So how do you decide which time steps to ask the computer to solve?
A. Very good. So there is something called CFL condition. It's also in the report.
Q. Okay.
A. This is do you remember, Friedrich check check. Lewy, L-e-w-y. These are all German. In 1810, 1928 they came with this and said you must have -- CFL conditions less than 1 means when the flow goes from here to here (indicating), your mesh and time step has to be small to capture the detail. Otherwise, it will be flying -- missing the details. Sorry.
So CFL condition is written in we've known for. If you look at the report, you will see when you do the code flow, CFL was .6. And when we went to the heated flow the Bair Hugger is running, we reduce that because the heated flow moves faster.

Q. Okay.
A. All the details are in the paper.
Q. Okay.
A. Yes.
Q. So when you obtained the results from the super computer --
A. Yes.
Q. -- did you receive -- did you receive separate files for each time step --
A. Correct.
Q. -- that the computer solved?
A. Correct. Sorry.
So, actually, you store -- like if you -- so the venue and the paper on the PowerPoint have one plane. So that's a cut in the 3D.
Beforehand you say I'm going to take the plane YZ number-something --
Q. Uh-huh.
A. -- and store all the time steps between this and that like 10,000.
MR. ASSAAD: Objection to the last question as being vague to the word "received," because it will receive the date. He'll receive the date on the computer. It's still stored on the super information.

THE WITNESS: It's all there.
BY MR. GOSS:
Q. Okay.
A. Many gigabytes you cannot transfer.
Q. Okay. So you're familiar with the Ansys program; correct?
A. Correct.
Q. Okay. And the Ansys program has TRN files. Are you familiar with those?
A. Yes.
Q. All right. Are the TRN files -- are those also intended to solve different time steps?
A. If -- if you solve an unsteady problem is -- if you solve Navier-Stokes, which Ansys does --
Q. Uh-huh.
A. -- you have to specify time step and the mesh as well, yes. Any Ansys code, you have to specify time-step in mesh.
Q. So how did you decide for the 505 calculation which time steps to focus on?
MR. ASSAAD: Objection to form.
THE WITNESS: We capture all the time steps, Delta T is affixed.
BY MR. GOSS:

Q. Okay.
A. We capture everything. When you plot, you you select something, say, after the Bair Hugger the blower started from that time on and -- yeah.
Q. Okay. So am I understanding you correctly that you took the information from a series of time steps --
A. Correct.
Q. -- and combined it? Is that right?
A. Let's say store it in a file, in one file --
Q. Okay.
A. -- yes.
Q. All on the super computer?
A. Yes.
Q. Okay. How many of those files, if you know, were created for this 505 calculation?
A. I can go back. Yeah, many. Yeah. Tens of -- yeah, many.
Q. Okay.
MR. ASSAAD: Just to clarify, tens -- ten files.
THE WITNESS: Tens plural. Tens and -- or -- yeah.
MR. ASSAAD: Tens of files?

THE WITNESS: Depending on how many you want to plot.
BY MR. GOSS:
Q. Okay. Are there any files that you received from Dr. Apte that you have not provided to counsel?
MR. ASSAAD: Objection to form.
THE WITNESS: I gave counsel every plot, everything that --
BY MR. GOSS:
Q. Okay.
A. -- we had. Nothing hidden. Nothing is hidden.
Q. Or withheld?
A. Or withheld.
Q. Okay. So if another researcher wanted to review the various time steps that are part of this calculation, they would have to have access to the stampede super computer?
MR. ASSAAD: Objection to form besides what's in his report. Or are you talking like time steps he used? Or what's -- I'm confused. I'm sorry.
BY MR. GOSS:
Q. So I'm talking about all the time steps

that were actually calculated by the computer, not just what's in your report.
Those files are stored on the Stampede super computer; is that right?
MR. ASSAAD: Objection to form.
THE WITNESS: Yes.
BY MR. GOSS:
Q. Yeah? Okay.
So -- and just to make sure I understand correctly, the files that you actually used in your report, are those the tens of files -- the results of the tens of files that are the combinations of the different time steps?
A. Correct.
Q. Okay. The new calculation, like the old one, was run with Dr. Apte's code; is that correct?
MR. ASSAAD: Objection to form.
THE WITNESS: It's the same code.
BY MR. GOSS:
Q. Is it sometimes referred to as the Stanford code?
A. Sometimes.
Q. Do you know what computer language the code is written in?
A. In Fortran.

Q. In Fortran.
And I believe you testified to this last time. Just to make sure I'm clear, you did not write this code? It was written by graduate students and researchers at Stanford?
A. Correct.
Q. Okay. Have you ever reviewed the actual lines of code in the --
A. No.
Q. -- Stanford code?
And before working with Dr. Apte to perform these two calculations, had you ever used the Stanford code for any CFD project?
A. Never.
Q. Do you have access to the Stanford code?
A. If I wish, I can. I have my own codes.
Q. Okay.
A. Yeah.
Q. But if you wanted access to the Stanford code, you could get access; is that right?
A. Oh, access means I can have the code, but I don't have access to Stampede you have to have security clearance --
Q. Okay.
A. -- for that. So I can take the code and

put it on my super computer, which is --
Q. Okay.
A. -- somewhere else.
Q. So are the lines of code only viewable on a super computer?
A. The lines of code -- the code itself, you can see -- you can see it on a lap -- not a laptop. On a PC.
Q. Okay.
A. In a work station.
Q. If you wanted to see the code on a laptop, how would you get it?
MR. ASSAAD: Objection to form.
THE WITNESS: This is proprietary code, so I have to ask and why because --
BY MR. GOSS:
Q. So you would have to get permission from somebody?
A. From somebody, yes.
Q. Okay. Who would you ask?
A. Dr. Apte.
Q. Okay. Dr. Apte is a consulting expert for the plaintiffs in this case do you understand that?
MR. ASSAAD: Objection to form.
///

BY MR. GOSS:
Q. If you understand that.
A. He's working with me.
Q. Okay. Sure.
Do you know anyone who would have access to the Stanford code who is not a consultant for the plaintiffs?
MR. ASSAAD: Objection to form. I'll clear it up on my direct. Go ahead. I think there's a misunderstanding that -- about the code that you don't -- like you're confused about.
MR. GOSS: Okay. That could be.
MR. ASSAAD: Okay.
BY MR. GOSS:
Q. I'm really just talking about the lines of code that you could view on a laptop that you testified to.
A. Uh-huh.
Q. Do you know anybody, other than Dr. Apte, who would have access? If you don't know, you can you can say you don't know.
A. I don't know.
Q. Do you know whether there is a compiled program that would allow you to run the Stanford code?

MR. ASSAAD: Objection to form.
THE WITNESS: No.
BY MR. GOSS:
Q. Okay. In the subpoena response, earlier we discussed your curriculum vitae and whether there are any updates from your last deposition.
I understand that you don't currently have a new CV; is that -- is that right?
A. Correct. Yes.
Q. All right. Other than the article that we've already discussed published earlier this year, do you have any new publications since --
A. I do, but -- yes, I do.
Q. Okay.
A. Not related to this at all.
Q. Okay. So none of your publications relate to -- well, do any of your new publications involve a CFD study of airflow in a room?
A. No.
Q. And I take it that none of the new publications would involve patient warming devices?
A. Correct.
Q. Have you ever been a licensed professional engineer?
A. No.

Q. And you may have been asked this last time. I apologize --
A. Okay.
Q. -- if you were.
Have you ever designed a heating ventilation and air conditioning system?
A. No. No.
Q. Do you claim any expertise in HVAC systems?
MR. ASSAAD: Objection to form.
THE WITNESS: No.
BY MR. GOSS:
Q. Okay.
A. No.
Q. Since your last deposition in June of 2017, have you made any new presentations, scholarly presentations?
A. Yes.
Q. All right. About how many?
A. June '16 -- June '17 --
Q. Yes, sir.
A. -- to now? May- -- maybe -- maybe one -- one only, yes. Not related to this.
Q. Okay.
A. I never presented this.
Q. Okay. So you said you have not presented

the results of either the 750 calculation or the 505 calculation to any academic audiences; is that right?
A. Correct.
Q. Have you spoken to any physicians about your work in this case?
A. Never, no.
Q. Do you have any plans to present your results to any medical audiences?
A. No.
Q. Since June of 2017, your last deposition, have you spoken to any authors of any articles you reviewed for work in your case --
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. -- in this case?
A. No.
Q. Other than your co-authors? I'm referring to articles other than articles that you yourself have written.
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Okay. Have you spoken to anyone at the centers for disease control and prevention since your last deposition?

A. No.
Q. Have you spoken to anyone at the Food and Drug Administration since your last --
A. No --
Q. -- deposition?
Have you communicated with anyone affiliated with the American society of heating refrigeration and air conditioning engineers --
A. No.
Q. -- since your last deposition? Okay. Otherwise known as ASHRAE?
A. Yeah. I know that word. Yes.
Q. Okay. Since your last deposition, have you spoken with any of plaintiff's experts in this litigation?
A. No.
Q. And I assume you have not had any conversations or communications with Dr. Scott A; is that true? Check check
A. No.
Q. So I'm correct that you have not had that conversation -- any conversations?
A. I did not have -- yes.
Q. Okay. Since your last deposition, have you had contact with anyone at the National Institutes

of Health?
A. No.
Q. You recall at your last deposition -- well, let me ask you this: Since your last deposition, have you had the opportunity to meet Dr. Farhad M?
A. No.
Q. Are you aware of that Dr. M conducted a CFD investigation of an operating room using a Bair Hugger device?
MR. ASSAAD: Objection. I'm going to instruct him not to answer. This was available before the general causation deposition. Again, I'll give you leeway if you promise to give me leeway, but this could have been asked and was asked during the general cause deposition.
BY MR. GOSS:
Q. Okay. So I'll just ask: Since your last deposition, have you given any thought to reaching out to Dr. M?
A. I don't know him. No, I have no interest.
Q. Okay. Do you understand that we are here today for a particular case, and that's the case of Mr. Louis Gareis?
A. I -- I guess so.
Q. Okay. Have you ever spoken with Mr. Gareis?

A. No.
Q. Have you ever spoken with Mr. Gareis' physicians?
A. No.
Q. Have you spoken with anyone affiliated with the hospital where Mr. Gareis's surgeries took place?
A. No.
Q. What's your understanding of what happened to Mr. Gareis? In other words, why is he suing 3M and Arizant?
A. I never asked, and I don't know.
Q. Okay.
A. I have no clue.
Q. Okay.
A. I don't even know the name.
Q. Do you intend to offer an opinion at trial regarding the cause of Mr. Gareis's periprosthetic joint infection?
MR. ASSAAD: Objection to form.
THE WITNESS: Since I have no idea about this case or anything, I just did it scientifically, that's all.
BY MR. GOSS:
Q. Okay.

A. Yes is it fair to say that the opinions you intend to offer at trial are the opinions that are disclosed in your two expert reports.
A. Which report.
Q. So there would be the March 29, 2017 report?
A. Okay.
Q. And there were some opinions expressed in that report; correct?
A. Okay.
Q. And then there's the more recent report from November.
A. Okay.
Q. Other than what's described in those two reports, are there any other opinions that you intend to offer at trial in this matter?
MR. ASSAAD: Objection to form. And what was produced to you for today and the videos that were not part of the report.
MR. GOSS: Okay.
MR. ASSAAD: On the 750 and stuff that was produced by the subpoena.
MR. GOSS: Okay.
MR. ASSAAD: That was due today.
///

BY MR. GOSS:
Q. So with counsel's addition of the materials that were produced today, is there anything you -- any opinions you intend to offer at trial that aren't otherwise contained in the documents that you have submitted in this case?
MR. ASSAAD: And the videos of today and the 750 produced before?
MR. GOSS: Including --
MR. ASSAAD: Okay.
MR. GOSS: -- all of those, right.
THE WITNESS: I cannot predict what my brain -- how it works.
BY MR. GOSS:
Q. I understand.
A. For three months, I can come one day and say, "Oh, but I didn't yet."
Q. So depending on what you're asked at trial, you may have responses that you're not aware of today; is that --
A. Correct.
Q. -- right?
Do you know what type of surgery Mr. Gareis had?
A. I have no idea about anything about

Mr. Gareis.
Q. So it was a hip surgery.
A. Okay.
Q. I'm represent to you that it was I hip surgery.
A. Okay.
Q. Do you know what type of -- do you recall what type of surgery is modeled in the CFD for the model 505?
A. When you say in the PowerPoint, you will see a knee.
Q. Okay.
A. Covered with a thing. That's what we were given. Yes.
Q. So the geometry in the CAD file is the same as --
A. Exactly.
MR. ASSAAD: -- objection to form.
BY MR. GOSS:
Q. All right. Do you have any understanding of whether there is a difference in the position of the patient for a hip surgery versus a knee surgery?
A. I do.
Q. Okay. What's your understanding?

A. The patient would not be lying on his back. He will be lying on his side, for example.
Q. Okay.
A. That's -- yeah.
Q. And so the patient for a hip surgery would be lying on his side.
How would his arms be positioned?
A. I have to think. I -- I don't know.
Q. Okay. So typically, the arms for a hip surgery would be both facing the same direction both on the same side --
A. Okay.
Q. -- instead of on the opposite sides --
A. Okay.
Q. -- of the midline.
A. Yes.
Q. Okay. The 505 model, the patient is still positioned with arms stretched out on either side; is that right?
A. Correct.
Q. Okay. Do you have an understanding of the difference in the placement of the Bair Hugger blanket for a hip surgery?
A. I can imagine, but I don't know for sure.
Q. Okay. So for a hip surgery, typically the

Bair Hugger blanket, because the arms are on one side, the remainder of the blanket is tucked under the mattress on the surgical table.
A. Okay.
Q. Your model for the 505 does not reflect that?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Is that true?
A. A 505 prediction where geometry of everything was similar to the 750.
Q. Okay. When you say -- when you say "similar" --
A. Was --
Q. Go ahead.
A. The arms are positioned -- the arms positioned in the 505 prediction, the position is the same as the one in the 750 calculation --
Q. Okay.
A. -- prediction.
Q. And the -- and the position of the Bair Hugger blanket in the 505 calculation, is that also the same as it was --
A. Correct.
Q. -- in the 750?

A. Yes.
Q. Okay. For the initial calculation before you did it, you paid a visit to an orthopedic operating room in Santa Monica --
A. Correct.
Q. -- is that correct?
A. Yes.
Q. For this new calculation, did you go back to an operating room and take any new measurements?
A. No.
Q. Since that previous operating room visit, have you seen a Bair Hugger blanket actually placed on a patient since that time?
A. We saw the blanket on a patient in Santa Monica.
Q. Yes.
A. Right.
Q. And then after that --
A. No. I have not seen it on a patient.
Q. Not since then?
A. Correct.
Q. Okay. Would I also be correct that you have not seen the Bair Hugger blanket placed on a mannequin since that time, since the Santa Monica visit?

A. Correct.
Q. For the new calculation, for the 505, am I right that you did not conduct any new measurements to support your boundary conditions, measurements of ambient conditions?
A. Correct.
Q. So that would include -- there are no new measurements of airflow velocity from the Bair Hugger blanket; true?
A. You mean measurement meaning experimental.
Q. Yes, sir.
A. Because we can use simulation to measure also.
Q. Okay. Yes. I'm referring to just to the experimental --
A. Yeah. Correct. No experimental measurements.
Q. Okay. There are no new experimental measurements. Am I also correct that since your last deposition you ever not conducted any validation experiments?
MR. ASSAAD: Objection to form.
THE WITNESS: You mean code validation?
BY MR. GOSS:
Q. No. I understand code validation.

A. Okay.
Q. I think I understand --
A. Okay.
Q. -- clearly the papers that you have cited --
A. Okay.
Q. -- for code validation. I'm strictly talking about experimental validation.
A. No experimental validation has been done since June '17.
Q. Okay. And that would include for the new calculation with the 505; correct?
A. Correct.
Q. Am I right that since your last deposition, you have not done any investigation of patient warming devices other than the Bair Hugger?
MR. ASSAAD: Objection to form.
THE WITNESS: Correct.
MR. GOSS: Do you mind if we take a short break?
MR. ASSAAD: Sure.
THE WITNESS: Sure.
THE VIDEOGRAPHER: Off video at 2:33 p.m.
(Recess.)
THE VIDEOGRAPHER: Back on video, 2:43 p.m.

BY MR. GOSS:
Q. Dr. Elghobashi, when we were reviewing the proposal for the calculation, which is Exhibit 5, we discussed the two computational details that would be different in this calculation; correct?
A. Yes.
Q. And the second item was the temperature for the new calculation. And you said that that was either supplied by counsel or in a document provided by counsel or both; is that right?
A. Correct.
Q. All right.
(Exhibit 6 marked.)
THE WITNESS: Thank you.
MR. GOSS: Okay. So this is -- Madam Court Reporter, this is 6.
BY MR. GOSS:
Q. So what's marked as Exhibit 6 was actually a document marked in your previous deposition as Exhibit 1-D.
Do you recall this document?
A. No. Memory --
Q. Okay.
A. -- cancels everything.
Q. Did you review this document in connection

with the new calculation on the model 505?
A. It could be. I don't recall. But could be. I have seen it before, so it's not new.
Q. Okay. Do you see where about five rows down it says "Model 505 Warming Unit" check document?
A. This one here (indicating)?
Q. On the front page. I'm sorry. I think you --
A. It says here (indicating).
Q. Oh, okay. You're looking -- I'm looking at the back.
Q. You're looking at the back.
A. It also says "Model 505 Warming Unit."
Q. Okay. All right. I was looking --
MR. ASSAAD: Over here (indicating).
BY MR. GOSS:
Q. -- at the front.
A. Oh, in the front. Okay.
Q. I guess. But my real question -- and I'll explain the reason I was looking at the front.
So in the -- just below that, there's a value of 40.5 listed under the column "MCST."
A. Correct check document.
Q. Okay. And that matches the temperature --

A. Okay.
Q. -- input?
A. Uh-huh.
Q. That's in Exhibit No. 5 --
A. Okay.
Q. -- is that right?
A. Right.
Q. Okay. So do you think or do you remember whether you would have obtained the value 40.5 from this table?
A. I can go back to my record --
Q. Okay.
A. -- somewhere, and it will tell me how I got this number.
Q. Okay. But as of right now, you don't know?
A. Correct.
Q. Do you -- in the new calculation, if you look further down the row where it says new 522, check document do you see where there's a column for time that says 36 degrees Celsius?
A. I do.
Q. All right. And that number is 3.2 minutes; correct?
A. Correct.
Q. And that is about a minute less than the

value for the model 750 warming unit listed just below.
Do you see that?
A. Yes. 3. -- yes. It's -- 1 minute in the 505 is 1 minute more than that; right?
Q. Yes, sir.
A. Okay.
Q. Yes, sir.
Did you take that difference in the time to reach 36 degrees Celsius into account in performing your new calculation?
MR. ASSAAD: Objection to form.
THE WITNESS: No. Not needed for me.
BY MR. GOSS:
Q. Not needed. Okay.
The next column over from time to 36 degrees Celsius is inches of Hï¿½0 --
A. Yes.
Q. -- is that correct?
A. Correct.
Q. Is that a measurement of pressure within the duct, if you know?
A. I have no idea. It's a measurement of pressure, but I don't know -- it doesn't say where.
Q. Okay.

A. Right.
Q. The measurement for the 505 is .44; whereas, for the 750, .96.
Do you see that?
A. Correct.
Q. Did that difference in pressure -- was that accounted for in the new 505 calculation?
MR. ASSAAD: Objection to form.
THE WITNESS: I don't know what this number means, therefore I cannot use it.
BY MR. GOSS:
Q. Okay.
A. Only the temperature I took.
Q. Where the temperature value of 40.5 is listed, that's in a column with the acronym "MCST."
Do you know what MCST means?
A. It's written here: "Average temperature" across the blanket. Check document
Q. Okay. But do you know specifically what the acronym is for?
A. I -- I would say the temperature of air leaving the thousand holes in the blanket.
Q. Yes.
A. Could be. Could be.
Q. Yes. Okay.

Did you ask counsel for any information about how these temperatures were -- the environment in which these temperatures were recorded?
A. No.
Q. Are you familiar with the American society of Testing and Materials?
A. Yes.
Q. Okay. Have you applied ASTM standards in your work?
A. No. No.
Q. No. But you've heard of ASTM standards?
A. Yes.
Q. Okay. Are you aware of of an ASTM standard for patient warming blankets?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Have you ever heard of an ASTM standard that would apply to patient warming business plan connects?
A. No.
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Okay.
MR. ASSAAD: What's this exhibit number?
THE REPORTER: 7.

MR. GOSS: This is 7.
THE WITNESS: 7.
BY MR. GOSS:
Q. So Exhibit 7, I assume you have never seen this document before?
A. Never.
Q. All right. And you can feel free to take a look at it. What I would ask you to just turn to quickly is on page 5 of the exhibit.
A. 5, yes.
Q. There's a glossary, and the second item there says: "Mean contact surface temperature," MCST --
A. Yes.
Q. -- correct?
A. Yes check document.
Q. And this says this is the average temperature all of the selected sense source beneath the active heating area of the blanket check document.
A. Uh-huh.
Q. Okay. So on the first page of the exhibit, there is an apparatus depicted.
A. Yes. Yeah.
Q. And I will represent to you that this is

the apparatus that's used to record temperatures --
A. For this --
Q. -- for the warming blanket as reported on Exhibit 6.
A. Yes.
MR. ASSAAD: Objection to form. Assumes facts not in evidence.
BY MR. GOSS:
Q. If you want to take a look at the document, please feel free.
A. (Witness nodding.)
MR. ASSAAD: I suggest you review the entire document before you answer any questions.
THE WITNESS: This will take time.
MR. ASSAAD: That's fine.
THE WITNESS: Six pages.
Do you want me --
BY MR. GOSS:
Q. Well, yeah. I want you to feel comfortable providing answers. I'm simply wanting to describe what this apparatus is.
So you can see that it displays --
MR. ASSAAD: Do you want to let him read it or --
///

BY MR. GOSS:
Q. Yeah. Go ahead.
A. (Witness perusing document.)
Okay.
MR. GOSS: Okay. Counsel, has Dr. Elghobashi signed a protective order in this case?
MS. ZIMMERMAN: Yes.
MR. GOSS: Okay. This document is marked confidential. That's why I asked.
BY MR. GOSS:
Q. So what this memorandum describes is an apparatus for measuring the temperature of the air coming out of the blanket --
A. Uh-huh.
Q. -- true?
A. Yes. Not it's true.
Q. Yes. It's just what the document says.
A. What the document says.
Q. All right. And so what the document describes is -- it's essentially a Styrofoam rectangle with copper sensors that have thermocouples welded to them --
A. Okay.
Q. -- is that fair?

A. Uh-huh.
Q. And then to measure the blanket temperature, it actually says on page 4 that -- if you are there at the top the convective warming blanket --
A. Uh-huh.
Q. -- is placed on the sensor plate arraying matrix --
A. Uh-huh.
Q. -- and covered unless otherwise indicated with a hospital standard check document cotton M blanket so that the edge of the blanket nearest the heater nozzle is aligned with the edge of the lagging material.
A. Uh-huh.
Q. So based on that description, the warming blanket is placed directly on the copper sensors --
A. Uh-huh.
Q. -- is that right?
A. Correct.
Q. All right. And in that situation, there would be very little air between the blanket -- the air exiting the blanket and the copper sensors; is that right?
MR. ASSAAD: Objection to form.

THE WITNESS: Let me think. Repeat, please.
BY MR. GOSS:
Q. Sure. Sure.
So what I'm -- the apparatus described here measures the temperature of the air coming out of the perforations --
A. Uh-huh.
Q. -- directly onto the copper sensors --
A. Correct.
Q. -- is that correct?
A. Yes.
Q. All right. And then underneath the copper sensors is a piece of Styrofoam insulation.
Have I described it accurately?
A. Yes. Like a human body.
Q. Well, okay.
A. Okay. I'm just saying replacing the human body.
Q. Yes. Yes.
A. Okay.
Q. Okay.
A. Yes.
Q. And so I'm going to use a term that I may not use correctly.

A. Uh-huh.
Q. But is the piece of insulation, is that an AD abatic surface?
A. If it's a good insulation, it could be -- each material has some conductivity.
Q. Okay.
A. If the guy said this is the best insulation, maybe.
Q. Okay.
A. Yeah.
Q. There may even be a description it says it has an R 10 rating?
A. That's right. So we have to -- you know like insulating homes they will use R or something.
Q. Okay. Okay. So it's AD abatic to the extent of R 10 insulation?
MR. ASSAAD: Objection to form.
THE REPORTER: I'm sorry. What was the answer?
THE WITNESS: Yes. I said "yes."
BY MR. GOSS:
Q. And so the temperatures with this apparatus are measured by transmitting the temperature of the air blown on to a copper --
A. Sensor --

Q. -- sensor through the thermocouple to the computer --
A. Uh-huh.
Q. -- true?
Okay. The air temperatures measured here are not taken at the edge of the apparatus --
A. Uh-huh.
Q. -- in other words?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Is that true?
A. I -- I have to admit, I got the main idea --
Q. Okay.
A. -- but tell me what you want to reach.
Q. Well, it's just the temperatures. So assuming that the temperatures recorded on Exhibit 6 were taken according to the method described in Exhibit 7, those temperatures would have been taken by copper sensors directly under the blanket.
Do you agree with me?
MR. ASSAAD: Objection to form.
THE WITNESS: Okay.
BY MR. GOSS:
Q. Okay. Returning to Exhibit 5. So --

which is the project description. We've already -- we just discussed the temperature difference from the previous model.
The flow rate is also different. It's 30 cubic feet per minute instead of 44.5 cubic feet --
A. Correct.
Q. -- correct? Okay.
And the 30 cubic feet per minute, was -- that was provided by counsel; is that correct?
A. Correct.
Q. Have you ever seen any documents that disclosed a different flow rate for the model 505?
MR. ASSAAD: Objection to form.
THE WITNESS: No.
BY MR. GOSS:
Q. Okay. So, for example, you have not reviewed the operator's manual for the model 505; is that true?
MR. ASSAAD: Objection to form.
THE WITNESS: I have seen the manual for both 750 and 505, but I don't remember. I don't think there was no disagreement between this one and --
BY MR. GOSS:

Q. And what was in the operator's manuals for the 505s?
A. I don't know if it's called operator's manual I know it's available on Google.
Q. Okay.
A. So I don't know -- yeah.
Q. So you recall arriving the operator's manual for the 505 as a result of the Google search; is that right?
A. Right. It's -- I think I did 750. And on the last page, it shows the temperature and the flow rate.
Q. Okay.
A. And I discovered that we used lower flow rate in 750 than what's indicated.
Q. Okay. That's for the 750.
A. Yeah.
Q. Did you do the same for the 505?
A. I don't recall.
Q. Okay. Would you agree with this statement: Particles kill turbulence?
A. It's an -- it's an incomplete sentence.
Q. Okay. How would you complete it?
MR. ASSAAD:
THE WITNESS: It's an incomplete means --

BY MR. GOSS:
Q. First, I guess we should get an answer to counsel's question. Do you disagree with the statement?
A. If the sentence is written like this --
Q. Yes.
A. -- then it is incorrect.
Q. Okay. How would you complete that sentence?
A. I have to -- have to show a map that explains everything, but --
MR. ASSAAD: Go ahead. Show the map.
BY MR. GOSS:
Q. Okay.
A. Okay. If you want me to do it, I'll do it, but -- it's too technical, but I can do it.
Q. Okay. So there is --
A. Qualifiers.
Q. Yeah. I understand there are qualifiers.
Are there qualifiers you can provide that a layperson can understand?
A. I'll try my best.
Q. Okay.
A. Yeah.
Q. So can you provide what the qualifiers would be to that statement: Particles kill

turbulence?

MR. ASSAAD: Do you need the board?

THE WITNESS: Yeah. I'm just thinking what to approach because it's -- okay. Okay. So this is a diagram.

And do you know logarithmic scale means.

BY MR. GOSS:

Q. Yes, sir.

A. Thank you.

Q. I do know that much.

A. I'm not being --

Q. No, I understand.

A. Because I -- yeah.

Q. It's okay.

A. So -- okay. The chair has no wheels. Be.

Okay. So before I do this, I'll do something else.

So if you have a container like this, a box.

Q. Yes.

A. And the volume means not length, width, height, volume. And you put some particles in. And you count them, so this is volume box. You count the particles. And each one, it's a /STPAOE. For example, get the volume and multiply by the number,

you will get volume of particles.

Q. Okay.

A. If you divide volume of particles divided by volume of box, we call this volume fraction. Volume fraction, which is fraction.

Q. Uh-huh.

A. And we call it /KHAOE.

Q. The Greek letter.

A. Greek letter. V, volume fraction, because there is another one for mass fraction, how heavy.

Q. And that's the mass of the particles?

A. Yes. Or the mass of the mass of the air.

Q. Okay.

A. You get VM and then go back here and I'll pull up this one. It's call fee V. That's a volume fraction and logarithmic scale. So this will be 10 -- 10 to the power minus 6 means the particle volume is 1 millionth of the box. Perfect?

Q. Yes.

A. And this will be 10 minus 3. That will be the volume of the particle will be one-thousandths. And you can go in here until you reach one. That means a bucketful of sand. It's everything.

Q. It's full? Okay.

A. No air; right?

Q. Okay.

A. And here that will be tricky now. This here is -- let's say you have a fan blowing air and you put a particle in -- in tweezers. And watch how long it will take that particle to reach the velocity of the air.

Q. Of the air being moved by the fan?

A. Right.

Q. Okay.

A. It's called -- that will be time response of the particle tau. Again, Greek.

Q. Yes.

A. Tau particle.

Q. Uh-huh.

A. And you compute that tau P equals row particle D square over 18 -- yeah. New like this (indicating). So diameter of the particle dense D, like if it's sand about 2,000 kilograms per. Diameter is 10 micron will be 10 micron square.

Q. Uh-huh.

A. 18 is the number by Stokes. And this is the pneumatic viscosity. So you open a table, and it gives you the viscosity of the air.

Q. You said kinetic viscosity?

A. Yeah, not dynamic. So this here equals new

over row. This is called dynamic viscosity --

Q. Okay.

A. -- density. So this one -- this one has the units of meter squared per second. This one has kilogram per meter second. So if you divide this by this, you get meter square per second.

Q. Okay.

A. So this is -- say somebody is smoking a cigarette and this position the viscosity is how this point of smoke goes somewhere else. By molecular interact. This is all molecular. So this is tau P. So this tells you for a particle how long it will take for a particle to reach 67 percent of the flow of the air because it comes from mathematics.

Q. Okay.

A. Okay. So that tells you how fast -- how -- how long it will take.

Q. For the particle to enter --

A. Okay.

Q. -- is that stream?

A. Notice that this is dimensionless because it's a ratio between two similar things. This has no units it's a meter cube over meter cube.

Q. Okay.

A. This one is microsecond or a second. So we need to have something that will also make it dimensionless. So in turbulence, if you look at a cloud, you will have things like large eddies like this.
Q. Okay.
A. And because of turbulence, when you have a Vortex -- this is called the Vortex, like in the sky.
Q. Yes.
A. Because they are moving, they get stretched. When you stretch a Vortex, which is rotating like a ballerina.
Q. Uh-huh.
A. When the ballerina doing like this (indicating) and does this, it goes faster --
Q. Yes.
A. -- to conserve angular momentum.
Q. Or given the winter Olympics, an ice skater would that not an appropriate --
A. Right. If you change the shape of the person who is rotating to another shape, it will rotate more. Okay? So this turbulence now and turbulence will create -- because of the *** will stretch by shear check check, say in a pipe or in a

sky in a shear. They create middles ones and tiny ones, very tiny ones.
Q. Okay.
A. So in the atmospheric above the air, this one here is the order of the kilometer or a mile. And this tiny one here, microns. And the micron is 1 millionth of a meter.
Q. Yes.
A. Okay. In order to know this is a turbulence fundamental, all this is controlled by the equation I wrote in the morning, Navier-Stokes. It explains everything. But it cannot be done by hand. That's why you do it on a computer.
Q. Okay. Navier-Stokes equation is turbulence?
A. No. Navier-Stokes equation covers any fluid motion from laminar to turbulence.
Q. Okay.
A. That's the beauty of it.
Q. Any fluid motion?
A. Any fluid motion. Honey moving in a pipe --
Q. Uh-huh.
A. -- or a rocket engine gas is coming out. All Navier-Stokes.
Q. Okay.

A. That's the beauty of this. This is 150 years old.
Q. Uh-huh.
A. But it cannot be solved. And many Navier audience tried. They can't.
Q. Okay.
A. That's why we waited until the computer -- super computer came.
So this is big scale, say L. And this is very tiny scale we call ETA for a name a guy called Kolmogorov, a Russian scientist, brilliant scientist.
Q. Kolmogorov?
A. Yeah. And they call this a Kolmogorov. That's a tiny scale you will find in a turbulent flow.
Q. It's a Kolmogorov scale?
A. Exactly.
Q. Okay.
A. And this is also a time scale. But -- so this is the small eddy like this and microns and it -- it dies after Kolmogorov time because of viscosity. So it doesn't live.
Q. Okay.
A. So energy goes from the big one to the

small one. Okay? So you will see in a minute why I need to do that to clear the map.
Q. So the tiny --
A. Eddy.
Q. -- eddy --
A. Tiny eddy.
Q. -- on the Kolmogorov scale will die because of viscosity?
A. Exactly.
Q. Okay. Which -- can you explain viscosity?
A. Okay. So when you have a box like this (indicating), like this room here, if you have a microscope take one centimeter cube. You will have 10 to the 22. 22 zeros, molecules.
Q. Yes.
A. They collide with each other, and that's how they spread things. So the honey has so high viscosity. It doesn't -- like if you push the honey here, it doesn't move; right? Where air, if I do something like this (indicating), it's already moved somewhere else.
Q. Okay.
A. Okay.
Q. But even air has viscosity?
A. Absolutely. Air, water. And liquid like

water has more viscosity than air because the molecules of air are far apart where the water is very close has very close molecules.

Q. Okay.

A. Right.

Q. Yes.

A. You will see now why I need this.

Q. Yes.

A. Okay. So this is turbulence. And we can pull all this in something called a spectrum item we put energy how many how much energy each of these eddies have. So this is scale. So here will be Kolmogorov scale, and this will be L came.

So this has so much energy. And this is a logarithmic scale so it looks like this. So this -- if this is 1 here is 10 minus 8, for example. The little tiny one has no energy. See, they die.

Q. Uh-huh. Uh-huh.

A. This here is 10 to the -- 10 million times more energy. So when you see a storm, you see these big things moving around, they will break a tree. This guy doesn't do anything.

Q. Okay.

A. Okay. So now you see this is called ETA.

Q. Another Greek letter?

A. Yeah. Because we run out of Greek letters.

Q. Okay.

A. 25, 26. So we did this, and we did this.

So to make this dimensionless, we divide it by Kolmogorov times K tau Kolmogorov. So now it's dimensionless and dimensionless. And we make a line like this. And here I created this map in '94. So that's -- I'm trying to think what to do --

Q. This is the E map?

A. Yes.

Q. I've heard of it.

A. It was done really you know some political happen for the record in Washington.

Q. A nuclear facility?

A. Yes. They had leakage of all the tanks from 1945.

Q. Yes.

A. And they are asking me to go and explain how this leakage --

Q. Okay.

A. So they told me to come, say, next week. And these people are from everywhere. So I thought of this map just to explain that. It was on that thing and I didn't know anything about it. I saw people would just forget it, but it is useful for

students.

So it looks like this (indicating). Okay. So if you have volume fraction in a box one millionth like very tiny, it's called no effect -- no effect. They call this one coupling. It means to the turbulent pushes these particles, but they have no effect on turbulence --

Q. Okay.

A. -- one way. And this becomes two-way. So --

Q. So those particles obviously do not kill turbulence?

A. Could --

Q. -- the one-way couple?

A. That's why I said -- see, that's why. One-way.

MR. ASSAAD: Objection to the last question with the use of the term "kill."

MR. GOSS: I was just referring to the earlier statement.

BY MR. GOSS:

Q. So the one way coupling --

A. Here.

Q. -- what size are the particles? Can you say?

A. Okay. So it doesn't matter because it's a volume fraction. So if you have a hangar in an airport and you put --

Q. Basketballs?

A. -- basketballs, still the volume fraction will be. However, I can go into detail because the basketball in the neighborhood of basketball, there will be effecting turbulence. These one are so tiny because tau P over tau K is so small. They just fly. Wherever the turbulence goes, they will go.

(Interruption in proceedings.)

BY MR. GOSS:

Q. I'm sorry. Please continue.

A. Okay. For this one now you're putting things to the ten -- one-thousandths. And they can affect things. So two-way coupling.

Q. Okay. So where there's two-way coupling?

A. So they will put here arrows like this for two-way coupling. And here is one arrow. And four-way coupling when they collide with each other -- so you will have -- for -- yeah, particle particle that's two-way particle then particle hit hit air. That's heavy. That's when you have like sediment in a river where you have a flood that will be in this or a heavy stand storm will be here --

Q. Okay.
A. -- or inside a rocket or something.
Q. So if we can come back to the model for the 505.
A. Yes.
Q. The particles in the Squames analysis --
A. Yes.
Q. -- those are all 10-micron spheres; correct?
A. Yes. Yes.
Q. All right. In the model, do any of those particles collide with each other?
A. No, because I looked at the details such this in one way coupling they just fly with them because they are so small compared to --
Q. Okay.
A. -- the volume.
Q. So it's one-way coupling --
A. It's here.
Q. -- as shown in the model; correct?
A. Correct. In the model -- yeah.
Q. Now, in the air of a typical room, there will be particles of a wide range of sizes.
Do you agree?
A. Correct. I mean -- not in a hospital. In

a room.
Q. Okay.
A. Like this room here, there will be dust or something, yeah.
Q. Okay. And in a -- in a hospital room, would there also be particles of different sizes --
A. Yes.
Q. -- in the air?
And, in fact, you model -- or the model reflects 10-micron particles, but Squame particles can be a range of different sizes; is that true?
A. No it's not a range. They go from 10 to 25-micron, with a thickness about 3-micron.
Q. Okay.
A. Yeah.
Q. And the air in an operating room, might there also be atmospheric dust?
A. Could be.
Q. Is there a size range for the particles that make up atmospheric dust?
A. 2-micron, one -- otherwise, you will be in a sandstorm; right?
Q. So the dust particles are smaller than Squame particles?
A. I hope in an operating room there would not

be a sandstorm. So that would be clean room, so --
Q. Yes. I would assume that's true.
A. Right. Right.
Q. Okay.
A. Okay.
Q. In an operating room, could there also be lint particles shed from clothing?
A. Yeah, right.
Q. Could there be droplets of moisture in the air as well?
MR. ASSAAD: Objection to form.
THE WITNESS: Yeah. It could be. I hope when they do the Rh relative humidity and the temperature in a room, it should be. Otherwise, it's not a toilet. It's not a bathroom.
BY MR. GOSS:
Q. Yes. No, but say during a -- during a procedure, during an operation, could there be air sterilized between --
A. Absolutely. We see surgeons coming out, absolutely, messy; right?
Q. Okay. All right. And so some of that could get in the air as well; is that true?
A. Right. We did not do a prediction of the whole universe --

Q. Yes.
A. -- right? In order to do a scientific study, you are going to have to create certain parameters --
Q. Yes.
A. -- and change only one parameter at a time.
Q. Okay.
A. If you change two, then I don't know what the cause were; right?
Q. Yes, I understand.
A. So you have to -- okay.
Q. No, I understand.
These other particles are outside the parameters of this experiment?
A. Correct.
Q. Okay. In the new model, am I right that the -- that Squame particles are arranged in the same way as in the previous model?
A. Correct.
Q. Okay. So there are essentially three rectangular areas around --
A. Correct.
Q. -- the operating table?
A. Correct.
MR. ASSAAD: Let him finish so -- for her.

THE WITNESS: Oh.
MR. ASSAAD: Let him finish the question.
THE WITNESS: Okay. Okay.
BY MR. GOSS:
Q. Yeah. And the particles are all arranged within a 1-centimetered layer above the floor; is that right?
A. Correct.
Q. Are any of the particles actually on the floor?
A. No.
Q. Okay. Because it any particles were on the floor, am I right that you would need to do a calculation to make sure the shear necessary to lift them from the floor?
A. Correct.
Q. Okay.
A. Actually, the best -- the best case scenario for your side is what we did because in a 10-micron they would be everywhere we could have done this, but I put it in the floor --
Q. Okay.
A. -- to be -- to be on your side.
Q. So in a -- in a real operating room, the Squame particles would be everywhere --

A. Right.
Q. -- right? And not just in a 1-centimetered layer near the floor?
A. A human being has one billion squames per four days. 250 million per day, 10 million per hour. And there were four people, it should be 40 million per hour. We put only 3 million.
Q. Okay.
A. That's the best-case scenario for --
Q. I understand.
A. Okay.
Q. And they are -- they're not allowed the airspace --
A. Correct. We could have done that. That would be the easiest thing for us to fill the whole room. That's so easy.
Q. Yeah.
A. To put it in the space, yeah.
Q. Okay. So now let me ask you this: When the model starts -- no. Well, yes. When the model starts, is the air in the room not moving at the very beginning? Or is the air constantly moving?
A. The air come -- yeah, from the grille.
Q. Okay. So by the time -- by the time you introduce the Squame particles, the air is already

moving in the room --
A. Correct.
Q. -- is that right?
A. Correct. The idea I just explained. The operating room is clean. The grille is -- the air is coming all the time. Then people come in before the BH starts. They shed something because the guy using -- so that's --
Q. Sure.
A. -- that's a sequence. I thought about this in detail, first do this, then this, then the BH.
Q. So in the Squame model for the new calculation --
A. Yes.
Q. -- are the Squames present at the beginning of the calculation, or are they introduced after the Bair Hugger is turned on?
MR. ASSAAD: Objection to form. Mischaracterizes his testimony. I believe he talked about how he did the calculations with the simulation and when he added the Squames.
THE WITNESS: Yeah, it's --
BY MR. GOSS:
Q. I'm just asking.
A. -- the property and paper have detailed

sequence.
Q. Okay.
A. To do that, yeah.
Q. Okay. But off the top of your head, do you remember, are the Squames present at the beginning, or are they introduced later?
MR. ASSAAD: Feel free to look at your report, too.
THE WITNESS: You can't. But you have a steady state flow in the room without anything. The Squames are there. Turn the blower on. That's the sequence.
BY MR. GOSS:
Q. Okay. Thank you.
A. That's as realistic as it can be.
Q. I want to turn next to your report. And I want to take another short break I think before we do that because I need to use the restroom.
A. Okay.
Q. But we'll keep it short.
A. Sure.
MR. ASSAAD: I don't care how much longer you have. We might want to get a snack or like a small --
MR. GOSS: Sure.

MR. ASSAAD: But maybe not now. But how much longer do you think you have?

MR. GOSS: I don't think I have a lot. I would think I have less than an hour. But if you want to get a snack now --

MR. ASSAAD: No. I mean --

MS. ZIMMERMAN: .

MR. ASSAAD: If it will be three hours, I'd say --

MR. GOSS: No. I really don't think so.

MR. ASSAAD: Okay.

MS. ZIMMERMAN: .

MR. GOSS: Yeah. I mean -- let's go off.

MR. ASSAAD: Off the record. Sorry.

THE VIDEOGRAPHER: Off the record at 3:28.

(Recess.)

THE VIDEOGRAPHER: Back on video at 3:41 p.m.

BY MR. GOSS:

Q. Doctor, before we go to your report, I want to go back to the published article because I forgot to ask you a question regarding the limitations described on page 27.

A. Okay.

Q. Are you -- are you at page 27?

A. Yes.

Q. Okay. So we talked about the sentence there's a lack of detailed experimental measurements of the 3D velocity field in an operating room during a clinical trial. The part I didn't read to you that I wanted to ask you about is where it continues. And it says: Which is the emphasis of the reducing implant infection in orthopedics, RIIiO pilot study check document.

A. Yeah.

Q. Is it your understanding that the RIIiO pilot study is going to conduct detailed experimental measurements of the velocity field?

A. Let me -- thank you.

MR. ASSAAD: Objection to form.

THE WITNESS: We got this from a reference, and we just said they plan to do that or something. It's very vague, really.

BY MR. GOSS:

Q. Okay. So based on your review of the reference --

A. Yes.

Q. -- do you believe that the R study is going to incorporate experimental measurements of the velocity field?

MR. ASSAAD: Objection to form.

THE WITNESS: I have no idea.

BY MR. GOSS:

Q. Okay.

A. It was just -- yeah.

(Exhibit 8 marked.)

MR. ASSAAD: What number?

MR. GOSS: No. 8.

THE WITNESS: 8.

BY MR. GOSS:

Q. So Exhibit 8 is a copy of your report in the Lewis Gareis case.

Do you see that?

A. Yeah. I don't see -- okay. Okay. Go ahead.

Q. On the first page, the second numbered paragraph, you indicate that you reserve the right to supplement this report because it's your express understanding that case-specific discovery remains open and that none of the treating physicians have been deposed yet, nor has third party discovery concerning the hospital in question been completed.

Since you wrote this report -- I think I already asked you -- have you reviewed any depositions of anyone associated with the hospital?

A. No.

Q. Have you reviewed any information provided by the hospital? Any documents provided by the hospital?

A. No. I actually don't know the hos- -- I don't know anything.

MR. ASSAAD: Well, he was provided pictures, and you have a copy of that.

MR. GOSS: Yes.

THE WITNESS: Yeah.

BY MR. GOSS:

Q. Okay. So did you review photographs of the operating room?

A. A drawing of four rooms and -- showing 14 air grilles of the ceiling. And that's it. There were no other air --

Q. Okay.

A. -- to use Adobe to measure everything.

Q. Okay. So you looked at a schematic of the --

A. Correct.

Q. -- HVAC system; is that fair?

A. I -- I don't know. It's a room provided by Mr. Assaad. I don't know the names or anything. It's just --

Q. Okay.
A. Yes.
Q. But it was a drawing that you were able to enlarge using Adobe; is that right?
A. Correct.
Q. And you said you took some measurements.
A. No. The size of the air grilles.
Q. The size?
A. The size of the air grilles. That's all. Actually, it was given to me the cubic feet of the room. Because I asked for width, height, and length. They couldn't give it to me, so only the cubic feet.
Q. Okay. All right. And you used that information to perform a calculation; is that right?
A. An estimation of air velocity at the ceiling.
Q. Okay. Other than the -- I want to come back to these photographs.
Did you review any photographs taken of this operating room?
A. No photo- -- never.
Q. Okay.
A. Only the sketch.
Q. Okay. Did you review that sketch in your

meeting with counsel on February 5th?
MR. ASSAAD: Objection to form. Instruct him not to answer if he's going to talk about the substance of our conversation.
BY MR. GOSS:
Q. Do you recall when you reviewed the sketch?
A. February 5.
Q. Okay. So I would like next to turn to the third page of the report, which is also numbered page 1, but -- it's the first -- no, I'm sorry. This page 1?
A. Okay. Page 1.
Q. So there are three page 1s.
A. Okay.
Q. And it's the third page, 1 --
A. It says 1, 2, 3 in my report.
Q. Yes.
A. 1, 2, 3.
Q. You're on the right page.
A. Okay. Okay.
Q. So in Section 1.1 --
A. Yes.
Q. There is a figure, Figure 1, which is the BH blanket geometry --
A. Correct.

Q. -- for inflation check document.
And you provided some measurements there --
A. Correct.
Q. -- is that right?
A. Correct.
Q. How did you take those measurements?
A. I have a blanket like this at my home when did I it.
Q. Okay. So you have an actual Bair Hugger blanket --
A. Correct.
Q. -- at home? A Model 522 blanket?
A. Correct.
Q. Okay. Do you have a Bair Hugger warming unit?
A. I don't.
Q. Okay. Have you ever seen a Bair Hugger model 505 warming unit?
A. On the web.
Q. Okay. But not in person?
A. Correct.
THE VIDEOGRAPHER: Lean to your right.
MR. GOSS: Sorry.
BY MR. GOSS:
Q. When you took the measurements of the

522 blanket, did you note the channels leading to the neck of the patient?
MR. ASSAAD: Objection to form.
THE WITNESS: Yeah, the middle section.
BY MR. GOSS:
Q. Yes.
A. That's for the neck. Yes.
Q. Yes.
And did you notice that there are two channels on either side of the neck section that lead from one of the -- from the inflated tube to a smaller channel that then --
A. Yes.
Q. -- leads out?
A. Uh-huh. Uh-huh.
Q. And so those channels communicate between the inflated section and the neck of the patient.
A. Okay.
Q. Okay. In your calculation, is there any air -- sorry -- in the CFD model, is there any air that exits at the neck of the patient?
A. No.
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Sorry.

A. No. This is based on observation in Santa Monica.
Q. Okay.
A. We had a patient, and we asked the patient.
Q. Okay. Moving to Figure 2 --
A. Yes.
Q. -- there are some more dimensions provided of the inflated blanket.
A. Correct.
Q. Okay. And the print is very small.
A. I know. I can explain very easily. You don't have to --
Q. Okay. My question is: The dimensions appear to be in inches. Are they? Should they be in meters?
A. Okay. So if you have an Adobe Acrobat on your computer --
Q. Okay.
A. -- there is a tool in the top toolbar. It's a rule --
Q. Okay.
A. -- for a scaling. So the reason this picture here is from somewhere, some magazine or --
Q. Okay.
A. -- from 3M.

Q. Okay.
A. And the only size I could get is the big tube you have five tubes; one big and four small ones.
Q. Okay.
A. And the big one from -- it says here actual inflated tube, 2.75 inches from check document 3M drawing. So I have a 3M drawing. Okay. I wanted to know what is the size when it's inflated this way (indicating).
Q. Okay.
A. So Adobe gives you .18 inch for that one. So scaling now. So I went to the R here I take that scale and measured by Adobe and multiply --
Q. Okay.
A. -- or divide. It's a scaling.
Q. Okay.
A. So the inches are from Adobe, the meter for me because I used only meters.
Q. Yes. Okay.
A. Okay.
Q. So Figure 1, those are measurements that you actually took --
A. Correct.
Q. -- of your Bair Hugger blanket?

A. Right.
Q. Figure 2, you used the Adobe software and a scaling tool --
A. Yes.
Q. -- to measure -- the dimensions shown in this picture?
A. Exactly, yes.
Q. Okay. Did you check to make sure that the dimensions shown in Figure 2 agree with the dimensions in figure 1?
A. Absolutely.
Q. Okay.
A. And I wrote -- actually, it should be written here. I don't remember it says. So if you take the length check document of Figure 1 and you make it flat if you make it round, a pie is 3.17.
Q. Okay.
A. So you get that. I did that. I think I wrote it somewhere here. Here in the bottom somewhere here (indicating). According to a liquid it says check document the diameter of the cylindrical surface facing the R equals .194 meters, which went under that flat, which produce the width of the blanket check document shown in Figure 1 according to L pie D; right?

Q. Okay.
A. No. I checked everything. Yeah.
Q. So Figure 3 --
A. Yes.
Q. -- is a schematic of the inflated blanket --
A. Correct.
Q. -- around the patient's arm; correct?
A. Correct.
Q. Okay. And it shows an air gap around the patient's arm; is that correct?
A. Correct.
Q. And --
A. The arm is resting on a blue thing.
Q. Yes.
A. That's the board in the hospital room in Santa Monica. They opened this armrest.
Q. Okay.
A. And this, I measured that.
Q. So you measured --
A. From --
Q. -- the width of the armboard; correct?
A. Correct.
Q. Okay. When the patient was there in Santa Monica, did you do any -- did you attempt to

do a cross-sectional measurement of the -- not just the arm board, but the blanket wrapped around the patient's arm?

A. Okay. So we -- we -- we took measurements and with things like this (indicating).

Q. Okay.

A. We did actually -- John Thornton spent hours measuring and we have pictures of the photos he took.

Q. Okay.

A. He measured everything in the blankets.

Q. Of the --

A. That we tried to make in this one here (indicating).

Q. Okay. You remember referring to figure four which is the measurements of the drape; correct?

A. Yes.

Q. Is -- now, for Figure 3 --

A. Yes.

Q. -- you mentioned that the width of the armboard is based on an actual measurement taken in Santa Monica; correct?

A. No.

Q. No. Okay.

A. From -- from the picture here, Adobe give -- gosh -- some .43-inch and that will come to .194. 19 centimeters. It's about 7.64-inch, which is 19 -- centimeter -- .4.

Q. Okay.

A. Yeah, it's very tiny.

Q. So the width of the arm circle --

A. Yes.

Q. -- shown in this figure --

A. Yes.

Q. -- is 5 inches?

A. Right.

Q. Okay. And so the diameter of the blanket circle --

A. Uh-huh.

Q. -- is 7.64?

A. Correct.

Q. Correct?

A. Yes.

Q. So if you subtract the arm circle --

A. Uh-huh.

Q. -- from the blanket circle --

A. Okay.

Q. -- you get an air gap of a little more than an inch and a quarter; is that right?

A. It's all written in the equation.

Q. Okay.

A. Yes.

Q. So when you were at the hospital in Santa Monica --

A. Uh-huh.

Q. -- did you actually observe an air gap around the patient's arm?

A. I can answer this to save our time. It was not like -- this is schematic means access. Concentric circles. It could have been this thing dropped. But the volume is still the same --

Q. Okay.

A. -- because it's wrapped. The volume would not change. Airflow would not change. It's the same.

Q. Okay.

A. It's only the shape to make easy calculation. This is to produce boundary conditions.

Q. So the circles make it easier to calculate --

A. Right. But the volume would not change. I'm sorry. Okay.

Q. But the volume would not change?

A. Right.

Q. And the volume you're referring to is the

area between the blanket and the patient's skin?

A. Correct.

Q. Okay. So you don't mean to suggest in this graphic that the blanket is actually suspended in air above the patient's arm?

A. No. No.

Q. Okay. So can you explain for me how you calculated the volume?

A. Of?

Q. The volume of air around -- between the blanket and the patient's skin.

MR. ASSAAD: Use the easel, if you need.

THE WITNESS: Okay. It's actually given to us. It's 30 cubic feet per minute; right?

BY MR. GOSS:

Q. Okay. So that's the volumetric flow rate?

A. Right. And you divide by the area. You get the velocity.

Q. And so the area is the area of the drape -- of the blanket?

A. Correct. The flat area of the blanket round or flat.

Q. Okay. Does that include both sides of the blanket, the full blanket?

A. Absolutely.

Q. Okay. All right. And so the calculation that you describe on page 2 at the top, you say the total cross-sectional area check document of both the right and left gaps --
A. Yes.
Q. -- equals -- to make it faster, .04087 meters squared; correct?
A. Yes.
Q. And so then you calculated the velocity of the air leaving the right and left arms by dividing the volumetric flow rate by the gap area --
A. Right.
Q. -- correct?
A. Correct.
Q. And then you arrived at a value of .3465 meters per second?
A. Right.
Q. All right. And I got out my -- I used Google to try to determine --
A. Yes.
Q. -- what that value is in feet per minute.
A. Right.
Q. And it's 68 a little more than 68.
Does that sound right feet per minute?
A. The meter is 3 feet. So this will be

.9-something. 1 -- 1 foot per second. Then multiplied by 60. You will have 60 per minute.
Q. Okay.
A. What did you get?
Q. 68.
A. So I did it --
Q. Sure.
A. -- normally.
Q. Okay. So how does that flow rate?
A. Uh-huh.
Q. Well, first of all, this is your calculation. This is not a calculation that is part of the CFD model; is that --
A. Correct.
Q. Right. Okay.
How does that rate of 68 feet per minute compare to the velocity of the inlet diffusers?
A. So the -- the inlet diffusers -- 3.2. It's a little bit higher the the -- I think .2 meters per second I have to look.
MR. ASSAAD: Look at your report, if you need to.
BY MR. GOSS:
Q. You can look.
A. Yeah, it's written somewhere. Table 1.

Q. It's page 35.
A. Really? Okay. 35? Okay. Thank you.
Q. So somewhere here it says inlet mean velocity grille, .19; right? What did I say?
Q. Yes?
A. I said something.
Q. Yes. You said .19.
A. Yeah.
Q. And here at the -- and this -- this is the velocity of the air leaving the blanket at the patient's hands.
A. Leaving the blanket before it hits the drape.
Q. Yes.
A. Okay.
Q. Okay. So which would be approximately at the location of the patient's hands?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. I'm sorry. Your answer?
A. Correct.
Q. Okay. And so the velocity at the patient's hands is actually higher than the velocity of the air at the inlet from the ceiling; correct?
A. Correct.

Q. All right. Would it -- I want to return to Figure 3. Actually, to Figure 2. You can see under the blanket, there are these tie straps.
Do you see that?
A. (Witness nodding.)
Q. "Yes"?
MR. ASSAAD: You have to say "yes."
THE WITNESS: Here in this, yeah (indicating).
BY MR. GOSS:
Q. Yeah.
A. It's fair.
Q. And at the -- in the operating room in Santa Monica, the blanket was also tied down around the armboard; is that right?
A. Correct.
Q. Okay. For your calculation, I think I understand what you're saying, but I want to make sure.
The air gap that's depicted in Figure 3 is based on the volumetric flow rate?
A. Correct.
Q. So are you saying that the air gap does not matter for purposes -- whether or not there actually is an air gap between the blanket and the patient's

arm does not matter for purposes of calculating the exit velocity?

MR. ASSAAD: Objection to form.

THE WITNESS: Here I'll tell -- here. So this is right hand, another left hand and air is coming like this (indicating).

BY MR. GOSS:

Q. Yes.

A. And there would be air coming here because it's behind the straps.

Q. Right. Because the blanket is not actually a sealed circle; correct?

A. Okay. What matters, you take this and cover it with a drape.

Q. Uh-huh.

A. All the air, whether it comes from this or this, will have to leave the drape; correct?

Q. Yes.

A. I thought about every detail. It took many, many hours to do that.

Q. And so --

A. Yes.

Q. -- to make sure I understand again, all of the air is exiting along the drape edge?

A. Correct.

Q. All right. Does the CFD model incorporate or -- how do I ask this? Does the CFD model show anything that's happening under the drape, or is it only at the drape edge?

MR. ASSAAD: I'm going to object again. These are all -- the model and the boundary conditions and the geometry have all been the same. And this goes to general causation. I'm going to instruct him not to answer. Now, I've given you some leeway that applies to Gareis, but now we're going into the actual geometry.

MR. GOSS: It's a new calculation.

MR. ASSAAD: It's the same -- the only things are two numbers that are different --

MR. GOSS: Okay.

MR. ASSAAD: -- and the results. You're going back into the geometry that could have been asked in the general cause. I'll give you leeway. I don't mind because I know it's kind of -- it's very difficult to do one without the other. I just want the same leeway when I go to -- when I have Abraham's deposition. If you're not going to agree to that leeway, I'm going to instruct him not to answer.

MR. GOSS: Well, I want to try to keep

things focused on Mr. Gareis as much as possible, the Gareis report.

MR. ASSAAD: The only two things he said were the temperature of the air and the --

THE WITNESS: Right.

MR. ASSAAD: -- and the flow rate.

MR. GOSS: Okay.

MR. ASSAAD: Everything else is identical. It could have been asked as to general cause. So if that's the rules you want to play by as we had the discussion yesterday, then I'm going to instruct him North when you start asking about geometry and about the drapes and about the velocity because that all could have been asked and answered under general cause.

BY MR. GOSS:

Q. All right. So I want to focus on this report, the -- Figure 4, the drawings in Figure 4.

So the drawing in the middle shows the arrows where the air from the Bair Hugger is exiting the drape edge; is that correct?

A. Exiting the drape edge.

Q. Yeah. Okay.

Does the CFD model for the 505 show what happens to the air underneath that drape?

A. No.

Q. Okay.

A. Do you want me toe explain why?

Q. Well, no. You can -- he can ask you later.

A. Okay.

MR. ASSAAD: Well, he could explain he said no he has a right to explain his answer. I mean, we've lodged that courtesy for everyone.

MR. GOSS: All right. As long as -- I've had you cut off many witnesses.

BY MR. GOSS:

Q. But I will allow you to explain.

MR. ASSAAD: I usually cut them off going off on a tangent.

THE WITNESS: I don't need to do it.

BY MR. GOSS:

Q. If you want to explain, you may.

MR. ASSAAD: Explain. Explain.

THE WITNESS: If -- if you look in the picture on the right side of Figure 4 --

BY MR. GOSS:

Q. Yes, sir.

A. -- you don't see the hand of the patient.

Q. That's right.

A. So it's all covered until somewhere --

I will hatch the area it's covered (indicating) and the other side.

Q. Yes.

A. Everything that goes under here under the blanket -- under the drape leaves the edges because think of this as -- if you have a water faucet like this injecting or a hair dryer in a bathroom.

Q. Uh-huh.

A. You put this on a plate. The pressure is -- hair dryer -- hair dryer blowing air on a flat plate floor, that middle point had the maximum appreciate called a stagnation pressure because air is not moving.

Q. Is that -- okay. Is that in the middle of the jet where it meets the surface?

A. Correct.

Q. Okay.

A. Okay. And then if you look -- because this is -- this pressure is highest and the atmosphere is low, all the flow will go like this (indicating).

Q. Okay.

A. It's like -- right? So here the air coming from here or here hits the drape.

Q. Uh-huh.

A. It has to go -- and the outside room has

atmospheric pressure. So it spreads you would say why didn't you go under the blanket -- under the drape? We can do that. We can do it --

Q. Sure.

A. -- safely. It costs money and time.

Q. Okay. Okay.

A. So what you see in this document is not trivial.

Q. I understand.

A. It -- he asked me in June, and I told him it took a lot of thinking. But I had to write it for him.

Q. Yes.

A. Okay.

Q. So in the CFD model --

A. Yes.

Q. And I think I know the answer just based on what you said.

In the 505 model, does the air from the Bair Hugger blanket interact with the air under the drape?

MR. ASSAAD: Objection to form.

THE WITNESS: The air under the drape, even in 750 or 505, moves only because the air coming from the blower hitting the drape.

BY MR. GOSS:

Q. Okay.

A. So we -- but the boundary condition are given at the edge of the drape.

Q. Okay.

A. And that's where the air -- so when you compute all the air around the edges, it came to so many cubic feet, the blower.

Q. In the 505 model, does the air from the Bair Hugger blanket lose any temperature through interact with air under the drape before it hits the edge?

MR. ASSAAD: Objection to form. At what time?

MR. GOSS: When the Bair Hugger air emerges from the evening of the drape.

MR. ASSAAD: Same objections. I think it's a vague question as to at what time. Are you talking about when the Bair Hugger is initially turned on or when it reaches a steady state as to what he did?

BY MR. GOSS:

Q. Did you understand my question?

A. So this computation assumes the air temperature leaving the little holes, thousand holes

from the blanket --

Q. Uh-huh.

A. -- has the same temperature all the way until it reaches the edge.

Q. Okay.

A. When it leaves the edge, that's where the interaction happens.

Q. Okay. Thank you.

On page 3, so the result of equations 4 and 5 is the air temperature at the blanket exit; is that right?

A. Four and five area --

MR. ASSAAD: I'm sorry. What was the question? Can you repeat the question?

BY MR. GOSS:

Q. Let simplify it.

So at the very end of the page, there is a result where you say T exit equals 39.73 C check document; is that right?

A. Correct.

Q. Okay. And that is the temperature, if you will, at the hands of the patient at the end of the Bair Hugger blanket; is that right?

A. Yes. So the edges of the -- at the edges of the drape.

Q. And also -- okay. So that's the temperature that will be at the hand and also at the edge of the drape?

MR. ASSAAD: Objection. Misstates prior testimony.

BY MR. GOSS:

Q. Is that right? Because let me -- let me make sure I understand what these calculations are showing.

I think -- and please correct me if I am wrong.

A. Okay.

Q. What you're calculating is the amount of absorption of heat from the air as it moves across the patient's arm; is that right?

A. Correct.

Q. Okay. And so T exit of 39.73, that's the temperature down from 40.5 Celsius --

A. Correct.

Q. -- where the air exits at the hand; is that right? Okay.

A. Correct.

Q. And it's that same temperature, 39.73 degrees C that is the boundary condition for the temperature at the drape edge?

A. Correct.

Q. Okay. Section 1.3 of your report is -- you provide an approximate estimate of the time taken by Squames to reach the operating table when using the Bair Hugger blower model 505.

And you provided in this report an estimate; correct?

A. Correct.

Q. And the estimated time was between 25 seconds and 60 seconds that the 505 blower will produce the same result as the 750; is that correct?

A. Correct.

Q. All right. In the actual computer model, the new --

A. Can I just correct you?

Q. Yes, you may.

A. The same result means -- to be specific, it will allow the Squames to reach the OT.

Q. Okay.

A. The operating table and the knee, not the number of Squames. Okay. That's -- that's all.

Q. Number --

A. Okay.

Q. But -- so that's the amount of time for any Squames to reach the operating table --

A. Correct.

Q. -- is that right?

A. Yes. Yes.

Q. All right. So in your calculation for the -- for the 505, how much time did it --

A. 43.

Q. 43 seconds.

MR. ASSAAD: And the CFD results, not his specific calculation here.

THE WITNESS: Large Eddy simulation. Or LES sorry.

BY MR. GOSS:

Q. Yes. So it's the new calculation --

A. Correct. Yes.

Q. -- took 43 seconds for the Squames to reach the operating table --

A. Correct.

Q. -- is that correct?

A. Yes.

Q. All right.

MR. ASSAAD: You need to speak up for the court reporter.

THE WITNESS: Oh, right. I'm sorry. I lost my voice. I do apologize.

I just want to say, there is -- there is

a curve like this in this -- you have it in the presentation. So this is time, and this is a number of Squames. There's a curve like this and it goes like this -- like that (indicating).

BY MR. GOSS:

Q. Okay.

A. So the beginning may not -- like 43 would be here. It starts like 30-something --

Q. Okay.

A. -- gradually.

Q. And I wanted to ask you about that.

A. Yes.

Q. So I think what you're referring to there is the Squame calculations for the knee space does that sound right?

A. Okay. I --

Q. Squame results?

A. They look many curves like this. But many of them is for an operating table box --

Q. Okay.

A. -- like one. And there is another one like -- yeah.

Q. If we could go to your published article, Exhibit 2.

A. Which page?

MR. ASSAAD: Page 24.
MR. GOSS: Thank you.
THE WITNESS: Okay.
MR. ASSAAD: Is that what you're looking for?
MR. GOSS: Yes. Thank you.
MR. ASSAAD: Okay.
BY MR. GOSS:
Q. So this is Figure 10 in the paper.
A. Yes.
Q. And these are the results of the calculation for the dispersion of Squames to four different locations --
A. Correct.
Q. -- in the model?
A. Yes.
MR. ASSAAD: For the 750?
MR. GOSS: For the 750.
THE WITNESS: Correct.
BY MR. GOSS:
Q. All right. And the one in the bottom left-hand corner -- this is C -- is the results for the knee area; is that right?
A. It's so tiny the screen --
Q. So I think large a larger picture?

MR. ASSAAD: Let him finish. He's going to provide something else.
THE WITNESS: Okay.
BY MR. GOSS:
Q. All right.
(Exhibit 9 marked.)
THE WITNESS: Thank you.
BY MR. GOSS:
Q. So just to clarify for the record, what we're looking at, this is your original report; correct?
A. Correct.
Q. And this is Exhibit 9?
A. Yeah. Yes.
Q. Okay.
A. Thank you.
Q. So these have larger --
A. Exactly.
Q. -- plots; correct?
A. Yes.
Q. So page 59.
A. Correct. Here.
Q. The plot at the top of the page --
A. Uh-huh.
Q. -- A?

A. Uh-huh.
Q. This is the total Squames in the patient's knee box; correct?
A. Correct check document.
Q. All right. And this shows a curve where not much is happening until about 22 seconds.
A. Correct.
Q. And then there is a sharp increase in Squames, followed by a short but equally sharp decrease.
A. Yes.
Q. Do you see that?
A. Uh-huh.
Q. All right. What accounts for the decrease in Squames after approximately 25 seconds?
A. Good question.
Q. Okay.
A. Okay. I was hoping you'd ask that question.
Q. Okay.
A. So here is the operating table, and here is the floor (indicating). And there's just one -- one part where the Squames are on the floor.
Q. In the airspace just above the floor contribute?

A. Right.
So this is one million. And we follow actually when they fly, they go all over. You can see yellow and green and I put those colors so you know exactly it's turbulent. When you have this million here and we're running for 32 seconds or so, they are depleted because they go up and then when they reach a certain height, the momentum of the air from the grille push them down.
Q. Uh-huh.
A. And then they go to the exit. We have four exit holes in the room. So that's exactly what it is. It's a good question. Yeah.
Q. Okay. So the -- overtime, the number of times --
A. Correct.
Q. -- the Squames is completed?
A. Yeah.
Q. And that's why this curve takes a downward term --
A. Correct.
Q. -- is that right?
MR. ASSAAD: Objection to form. In the model in the model you're talking about --
MR. GOSS: In the model --

MR. ASSAAD: Okay.
MR. GOSS: -- as shown on this.
THE WITNESS: So --
MR. GOSS: -- plot.
THE WITNESS: Yeah. In reality, they will be there, 40 million Squames.
BY MR. GOSS:
Q. Okay.
A. And therefore, that curve will not do that like this (indicating).
Q. Okay.
A. It's 3 million, they are gone. As turbulence.
Q. Okay. Are you showing -- the curve you've drawn there --
A. Continues for some time. Then it will deplete again, then go out.
Q. Okay. So since your first report in your last deposition --
A. Yes.
Q. -- have you done any more research into counting of Squames in an operating room?
A. No.
Q. Okay. So nothing new there?
A. Correct.

Q. Okay. In your 505 model, did you see a similar depletion of Squames in the knee space over time?
A. Correct. We have --
MR. ASSAAD: I don't have that.
THE WITNESS: It's here. We have it here somewhere.
BY MR. GOSS:
Q. Oh, is that in a PowerPoint?
A. Yes. Yes.
Q. So I -- I don't want to pull it up.
A. Yeah.
Q. But from your memory --
A. Right.
Q. -- you see a similar depletion of Squames over time --
A. Correct.
Q. -- correct?
A. A longer time. Like this end at 30. The other one, 43.
THE REPORTER: I'm sorry?
THE WITNESS: Okay. In a set of 30 second, we went to 43 second.
BY MR. GOSS:
Q. Okay.

A. So the drop will be later because they start later.
Q. Okay.
A. I'll answer all of them.
Q. And in the 505 model, is it also true as it was in the 750 model, that the only places where the Squames stop is at the intake to the Bair Hugger and at the knee?
MR. ASSAAD: Objection to form.
THE WITNESS: Could you repeat the question again slowly?
BY MR. GOSS:
Q. Sure. Sure.
And I think know the answer because everything is the same except for these two inputs; right?
A. Correct. Correct.
Q. But -- so do the Squames in the 505 model -- do they only stop at the patient's knee and at the intake to the Bair Hugger device?
A. Correct.
Q. Okay. Do you know -- do you know whether actual Squames have any adhesive properties?
A. I don't know the biological properties of Squames, but it could stick; it could not stick.

That's not my area.
Q. Okay.
A. Yeah.
Q. So coming back to your estimate of the time taken by the Squames to reach the operating table on page 4 of your report --
A. Yes.
Q. -- am I right that this is before the calculation?
A. Correct.
Q. You estimated that the effect would be the same but that it would take more time?
A. Correct.
Q. Okay. What if the flow rate was reduced to 25 cfms? Would you also estimate that the results would be the same? It would just take more time?
A. Correct.
Q. All right. What if the flow rate were reduced to 15 cfms?
A. Same.
Q. Same.
What if it were reduced to 1 cfm?
A. There's no motion. 1 cfm is like very -- nothing.

Q. Okay. Okay. So you need to have enough motion --
A. Yeah.
Q. -- to move the Squames; is that right?
A. Right. Right. Because you have grilles in the ceiling, the flow in the room is always turbulent, never trust anybody says laminar flow. There is no laminar flow.
Q. That's one thing I feel like I finally learned.
A. So this is important. That means the turbulent eddies I showed in the previous eddies.
Q. Yes.
A. Large eddies will scavenge whatever is in the flow and bring it up or something.
Q. Okay.
A. What happens to the Bair Hugger heated air is that it enhances the process because hot air could rise above the floor.
Q. Okay. So what if -- so what if we reduced the --
MR. ASSAAD: Just -- Corey, that's kind of distracting, you clipping your nails. Could you just --
MR. GORDON: I wasn't clipping.

MR. ASSAAD: Or you're clipping something. That noise is just distracting. I'm not upset. I'm just saying could we wait until a break?
BY MR. GOSS:
Q. All right. So I understand what you're saying, that the heated air enhances the process?
A. Correct.
Q. So if we reduced the temperature from 40.5 C down to, say, 35, would you expect the same thing to occur? It would just take --
A. Okay.
Q. -- more time?
MR. ASSAAD: Objection to form. Irrelevant hypothetical.
THE WITNESS: Okay. For -- for a lump air -- lump of air to rise a distance, it's buoyancy rate. So it rises because something called row cold minus row hot gravity of acceleration.
BY MR. GOSS:
Q. Row cold?
A. Minus row hot.
Q. Row hot?
A. Time gravity gives a force that lifts it up.
Q. That's the buoyant force?

A. Yes.
Q. Okay.
A. So this row cold will be 16 degrees centigrade. Row hot, 39.
Q. Okay.
A. So the hot -- this -- once you have temperature gradient, 16 the air conditioning 16, if you put 32, 37, 39, 40, big difference. This is like 22 centigrade difference. Delta T is the gradient check check.
Q. Okay.
A. And this happens locally; cold, they do not mix. This will go up; this will go down (indicating).
Q. Okay. So as long as the Bair Hugger introduces a temperature gradient --
A. Perfect.
Q. -- it will cause the air to rise --
A. Yes.
Q. -- and carry Squames with it; is that your opinion?
A. Yes.
Q. Okay.
A. Depending on the and count all these things in the previous --

Q. Okay. So, again, as long as there is some gradient --
A. Locally.
Q. -- locally, it will lift the Squames?
A. Yes it will lift the air first.
Q. It will lift the air first?
A. And then the drag on the little 10-micron will carry that with it.
Q. Okay. And so you can make the gradient smaller?
A. Yes.
Q. But that just means it will take more time to get to the same place?
A. Correct.
Q. Okay.
A. Think of a water kettle on the stove. If you have an electric stove, you put ten, boil in one minute. Put it on two, half hour it still boils because you put energy in a closed volume.
Q. Got it. So, for example, 17 degrees, if that were row hot, and row cold is 16, you have 1 degree --
A. It would take forever.
Q. It would take forever?
A. Right.

Q. But you would eventually get there?
A. If -- okay. All these here, if this is the room, everything the same we change only one parameter.
Q. Yes.
A. You lower the temperature difference, it will take longer.
Q. Okay. Okay. Temperature gradients will occur in an operating room regardless of whether the Bair Hugger is present do you --
A. Correct.
Q. Okay. By the presence of other sources of heat in the room; true?
A. Correct.
Q. Okay.
A. And we accounted for all those in both reports.
Q. Okay. That's where I want to turn to next. Do we want to take another short break or keep going?
MR. ASSAAD: How much more do you have?
MR. GOSS: Well, I've been taking more than I thought I was going to.
MR. ASSAAD: Let's take a break, then --
MR. GOSS: All right.

MR. ASSAAD: -- because of the uncertainty.
MR. GOSS: Yeah.
THE VIDEOGRAPHER: Off video, 4:32.
(Recess.)
(Exhibit 10 marked.)
THE VIDEOGRAPHER: Back on video at 4:44 p.m.
BY MR. GOSS:
Q. Dr. Elghobashi, Exhibit 10 is in front of you. And is this the calculation we spoke of earlier that you performed based upon the drawing of the grilles in the operating room?
A. Yes.
Q. All right. And the date of the document is February 6, 2018; correct?
A. Okay. Yes.
Q. So this is a calculation that you performed after the results came back from the super computer; is that right?
A. I have to -- have to read to see what they are.
Q. Okay.
A. (Witness perusing document.)
It's independent. This is just about I want to satisfy in my head.

Q. Uh-huh.
A. What is the velocity of the air, because I don't have any information.
Q. So this is completely separate from --
A. Completely.
Q. -- from the model?
A. Yeah, completely.
Q. Okay.
A. Yes.
Q. Can you explain for me what you did with this calculation?
A. Sure. So Mr. Assaad gave me to numbers of the No. 1, the volume of the room where this operation was conducted --
Q. Okay.
A. -- was 128-meter cube. He actually gave it to me cubic feet and I converted to -- it was 5,000-something some.
Q. Okay.
A. That's one number the only other number he gave me was the air exchange per hour of 24 check document. That's it.
Q. Okay.
A. And I wanted, from these two numbers, do all the calculation to figure out what is the

velocity of the air leaving the grilles in that new room.
Q. Sure.
Is the -- is the volume of the OR -- is that larger or smaller than what's in the 505 model?
A. Smaller.
Q. Smaller room. Okay.
A. The other one, I think, was 160-meter cube, I think.
Q. Okay. And so what you determined, based on this calculation, is that the inlet velocity for the Providence operating room was lower than what is in the 505 calculation; is that right?
A. 750 calculation.
Q. Oh, the 750.
A. And I don't know what Providence mean.
Q. I'm sorry. That's the operating room --
A. Sketch.
Q. -- that's depicted in the drawing.
A. Correct.
Q. Okay? So you're -- what you conclude here is that the inlet velocity, based on the inputs you were provided is lower than what is in the 750 model; is that right?
A. Since the rooms only had nothing to do with

the -- the 750 or 5- --
Q. Right. Okay.
A. It's a room inlet. And room inlet was .19 for 1 case, and now it's .11.
Q. Okay.
A. Now almost double. Almost double.
Q. All right. And so you conclude that the Bair Hugger model 505 heated air leaving the drape will meet less resistance to rise than in the original OR, which is where the surgery took place; is that right?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. If you know.
A. The original OR is the 750 model.
Q. Oh, oh, okay. All right.
A. I was not aware that this page -- I was -- it's an internal memo to myself.
Q. I see.
A. I should have made it clear.
Q. I -- so -- so -- okay.
And then you go on to say the plume of the heated air will rise faster in the new OR than in the original OR. Check doc
And when you say "the new OR" --

A. It's --
Q. -- you're referring to the OR shown in the drawing; is that right?
A. Correct.
Q. You're not referring to the OR in the 505 calculation?
A. No. This is the only sketch I have.
Q. Okay.
A. And I called it new compared to the old --
Q. Okay.
A. -- 750 that's --
Q. Because the inlet velocity in the 505 calculation is the same as in the 750 calculation?
A. Correct.
Q. Okay. Other than this calculation, did you take into account for your opinions in Mr. Gareis's case any other information specific to the operating room where the surgery took place?
A. No.
(Exhibit 11 marked.)
THE WITNESS: Thank you.
BY MR. GOSS:
Q. Dr. Elghobashi, Exhibit 11 is two photographs taken by my colleague of the -- depicting the ceiling in the Providence hospital operating room.

And do you recall from the drawing you reviewed the way that the inlet diffusers were arrayed in the ceiling?
A. Yes.
Q. Okay. What was that arrangement?
A. So there were two rectangles in a rectangle thinner grille --
Q. Yes.
A. -- outer rectangle, wider grille.
Q. Okay.
A. And the number is different. I think 6 and 8 or --
Q. Okay.
A. -- something like 14 total.
Q. And looking at the first picture, can you see there's an inner thin rectangle?
A. Yes.
MR. ASSAAD: Look at this picture, first one.
THE WITNESS: First one.
Yes.
BY MR. GOSS:
Q. And then there's a light, and then there's an outer rectangle.
Do you see that?

A. Yes.
Q. Okay. The diffusers are not arrayed over the operating table --
A. Correct.
Q. -- would you agree? Okay.
Based on your training and experience and expertise in turbulence, would this arrangement of diffusers have an effect on airflow in the room relative to what's depicted in the model?
A. Okay. Can I use this board?
Q. Yes, you may. I guess before you use the board, can you answer my question yes or no and then explain?
A. It will make a difference --
Q. Okay.
A. -- but I'll show you how.
Q. Thank you.
A. So -- so in 750, the grilles in the ceiling were projected over the table.
Q. Yes, sir.
A. So all the air will come like this (indicating). In 3D of course I'm just making it 2D.
Q. Uh-huh.
A. Right. So they will scavenge anything in

front of them.
Q. Uh-huh.
A. In the new one, the operating table is here (indicating), but the lights -- I have to make a ceiling. So I'll make a ceiling here (indicating).
And I will -- I will dot the location of the outer rectangle. And the instead rectangle lights -- these are all lights -- I mean, grilles. Grilles. And if you project them on the floor, the air comes outside the table.
Q. Okay.
A. That's what I saw from the sketch.
Q. Yes. And will that have an impact on turbulence within that room?
A. Correct. So two -- two answers. These are good questions.
If you -- from this page here Exhibit No. 10 --
Q. Yes.
A. -- if you take that velocity of air coming here, it computes Reynolds number.
Q. Uh-huh.
A. RE. It's about 6,000.
In this one, RE is close to 10,000. So this is more turbulent, more mixing. And when it

interact with the air from the drape here (indicating), this one is a mild term of 6,000.
Q. Okay.
A. It's mild turbulence, and outside the domain of the table. Therefore, the Bair Hugger -- I don't know if you put on right or left -- will have less resistance to rise -- you will be hot air from this. So more cold balls.
Q. Cold balls?
A. Air blobs, b-l-o-b-s.
Q. Okay. Did you calculate the Reynolds number of 6,000 based on the values provided by Mr. Asssad?
A. No, no no.
Q. How did you calculate the Reynolds number?
A. Okay. Mr. Assaad only give me two number.
Q. Okay.
A. The cubic feet and the results -- two numbers. Cubic feet and the ACH 27 --
Q. Uh-huh.
A. -- after I get the velocity.
Q. Okay.
A. The Reynolds number equals U, times L, times kinetic viscosity, like we talked about before.

Q. Yes.
A. "U," I know it's like -- yeah, "U" -- this one is .11-meter per second. And "L" --
Q. Is that a constant value, or is that --
A. For the grille.
Q. Grille.
A. Because I -- I divide -- okay. How did I get this one? You do how many cubic feet of air comes in the air to make 24 changes.
Q. Okay.
A. And you do the volume through that.
Q. And you know the number of grilles?
A. And you know the area because there are different areas. One, the bigger -- the wider one outside and narrower outside.
Q. You said there are wider grilles outside and narrower grilles inside?
A. Correct. In the two rectangles.
Q. In the two rectangles?
A. So if you divide the flow rate, which I got from the changes, divided by the total area, you get an average velocity --
Q. Okay.
A. -- right?
And then to the Reynolds number, you need

an L. M is --
Q. For the Reynolds number, you need an "L"?
MR. ASSAAD: You need to speak up for the court reporter because she's having a tough time understanding you.
THE WITNESS: I know. I apologize.
MR. ASSAAD: I'm just saying.
THE WITNESS: We know the velocity and the length and viscosity is air is viscosity is known.
BY MR. GOSS:
Q. Okay.
A. Okay. So the two types rectangles, one narrow like this and one, I think, double the width but the same length.
Q. Okay.
A. So there is something called hydraulic diameter. You replace a rectangle by this. You do this and you get -- so I found 6,000.
Q. Okay. So the key value here for calculating the Reynolds number --
A. Yes.
Q. -- is the velocity out of the diffuser?
A. Right.
Q. Okay.
A. I did not know that this paper will be

distributed. I would have put more details, but this I thought it was an internal memo. I didn't know it was --

Q. Okay.

(Exhibit 12 marked.)

BY MR. GOSS:

Q. Okay. Exhibit No. 12 is another photograph from the operating room at Providence Hospital where Mr. Gareis's surgery took place.

You see in the foreground, there's some equipment. On the left -- I don't know if you can make it out -- there is a Bair Hugger.

A. Yes.

Q. Okay. In the middle there is a stack of equipment on a cart.

A. Correct.

Q. Do you see that? Okay.

MR. ASSAAD: I just want to make my objection real quick on all these photographs that they're not -- they're not representative of what was there at the time of Mr. Gareis's surgery, especially the Bair Hugger we know is a 505 and yours is a 750.

MR. GOSS: Understood.

MR. ASSAAD: As well as other -- or 757.

MR. GOSS: Yes.

MR. ASSAAD: So I just want to put for all the pictures on the record that it's not representative.

MR. GOSS: Noted. Okay.

BY MR. GOSS:

Q. Other than the Bair Hugger, none of the equipment shown here -- and again, this is subject to Mr. Assaad's objection.

But none of the equipment shown here is included in the CAD file for Dr. Apte's CFD; correct?

A. Correct.

Q. Behind the stack of equipment on the cart, do you see an air grille?

A. Yes.

Q. Okay. Do you -- do you know how many air grille return grilles there were in this operating room?

A. Two.

Q. Okay. And I will represent to you that the air grille shown here is one of the two.

A. Correct.

Q. Okay. And it is -- would you agree with me that it is not near the floor?

A. Absolutely.

Q. Okay. So the air grille is some distance up the wall.

And can you tell me, based on your training, experience, and expertise, what effect the placement of that air grille would have on airflow within that room?

A. Sure. Can I ask you a question?

Q. Yes.

A. The two of them are raised like this, or is one up and one down?

Q. One up and one down.

A. Okay. So --

Q. I should say the one down is on the other side of the room.

A. Okay. Just to compare with the room used in both 750 and 505.

Q. Yes, sir.

A. When you have -- this is the ceiling, and air comes like this (indicating). And this is the floor. And let us assume two of the four grilles on the floor exit grille exit grille -- and this is inlet.

Q. This is the model for the 505 and the 750?

A. Correct.

Q. Okay.

A. So after leave and turbulence and all this, it will leave like this, because of the pressure difference; right?

That means if you have a BH blower somewhere here and the plume rises like this (indicating), because the Bair Hugger is always on the floor --

Q. Uh-huh.

A. -- under the table or close to the corner of the table. The effect of the grille like this -- and those are here -- gives more resistance to the Bair Hugger plume to go up.

Q. Okay.

A. Compare this scenario to this one. The air is coming here and now there is a wall here. And you have an opening here (indicating). Always fluids move to the lowest resistance. You can see that in your home if you have a leak in the water or anything, they will always go to the least resistance.

Q. I have experienced this.

A. Okay. So it will go like this (indicating). That means the blower here, the Bair Hugger is here (indicating). No resistance. The plume will rise

faster.
Q. In the model for the 505 and the 750 --
A. Yeah.
Q. -- is the return air -- is it -- is it passive, or is it powered?
A. Passive.
Q. Okay.
A. Same here. Because they have suction.
Q. Do you know whether the exhaust in the Providence hospital OR was powered?
A. No clue.
Q. Let me ask you a question about the bottom --
A. My answer to this one was comparing apples with apples. If you have --
Q. Sure.
A. -- four grilles, two grilles, different position.
Q. Okay.
A. That's all.
Q. Okay. So if we take the Bair Hugger out of the bottom drawing --
A. Uh-huh.
Q. -- which is the scenario with the raised vent, will the location of that vent have a tendency

to pull air up from lower parts of the room?
MR. ASSAAD: Objection to form.
THE WITNESS: Could you repeat slowly?
BY MR. GOSS:
Q. Sure.
A. Carefully use this. Like tell me where this one or this one.
Q. The bottom one.
A. Okay. Bottom one.
Q. So the air has to leave the room. And when it leaves the raised exit, it will also pull air from below where the grille is?
A. Correct (indicating).
Q. Okay?
A. But viscosity again --
Q. Yes.
A. -- air pulls air, right.
Q. Got it.
A. But, actually, it will give more chance of this to rise (indicating) because it's all embedded --
Q. Yes.
A. I'm sorry. I'm saying those are embedded together in this here, leaving the Bair Hugger alone here (indicating).

Q. Okay. So to make sure I understand, you're saying that the raised grille will present less resistance for a plume of heat for the Bair Hugger to rise?
A. Correct.
Q. But you also agree that, taking the Bair Hugger out of the picture, the raised grille will pull air from below the grille out --
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. I'm sorry. What was your answer?
A. Let me -- if there is no suction outside, or if it's due to pressure difference --
Q. Okay.
A. -- in the room here, you will have -- easier to go this way.
What happens here -- actually, I can give you more detail about this. When you have an airflow like this, it creates recirculation zone. It's called dead flow, like this. And here will be like that. It's called recirculation zone. Like I can give you many examples.
Let us say you have a pipe. This is centerline. And say 1 meter diameter. Connected to it a pipe was half meter diameter like this to make

it complete; right? Two pipes. One small connected to one big. Unless the flow is coming here. In institution like this can have jet engines or rockets --
Q. In any situation like this, jet engines or rockets?
A. Or any situation that has two pipes, one big connected to one small, it will have a recirculation zone that's called dead -- dead zone, like this (indicating).
Q. Okay.
A. So here because the geometry of the room, if this is going out, it will make two bubbles towards recirculation.
Q. One above the grille and one below?
A. Correct. Correct. You can do that by smoking you can put a cigarette.
Q. When the Bair Hugger plume meets the room air, does that also create dead zones?
A. Yes. It -- actually, all videos show that.
Q. Okay.
A. You can look 750 or 505, yes.
Q. Okay.
A. When you have two different -- two shear layers, two different flow, they will create this

and you can see it in the videos in the PowerPoint.
Q. Okay.
A. You will see it. Yes, I'm sorry.
Q. You've got to get back here.
A. Okay. How come they didn't show me these pictures before today.
MR. ASSAAD: Because they are irrelevant.
BY MR. GOSS:
Q. Okay.
(Exhibit 13 marked.)
BY MR. GOSS:
Q. Showing you --
A. 13.
Q. -- Exhibit 13.
A. Yes.
Q. Okay. If you compare it to 12, this is a close-up of the equipment stack --
A. Okay.
Q. -- on the blue cart. Do you agree?
MR. ASSAAD: Objection. Same objection as before. This was taken six years or eight years later --
MR. GOSS: Okay.
MR. ASSAAD: -- from the date of surgery we don't know if it's representative or if they had

that equipment at the time.
BY MR. GOSS:
Q. So I will represent to you that the -- that machine at the bottom of the stack that has the hand pointing to it -- I think that might actually be my hand -- is a generator for an electro machine?
A. Okay.
Q. Okay? Can you see along the side of that machine that there are louvers in the case of the blue machine. And if you --
A. The blue sides?
Q. Yes, sir.
A. Yes.
Q. And you can see on the second picture there are also louvers on that machine?
MR. ASSAAD: On this page (indicating).
THE WITNESS: Yes.
BY MR. GOSS:
Q. Does that indicate to you that is heat is generated within the case of that machine?
A. If it's disconnected to a power source it will do that.
Q. So obviously it will generate heat only when it's in operation?
A. Correct.

Q. Okay. And if you look at the Bair Hugger shown here -- and obviously, this is not the Bair Hugger that was used in the --
MR. ASSAAD: Page 2.
BY MR. GOSS:
Q. -- surgery. On page 2.
So, again, this is not the Bair Hugger that was used --
A. Okay.
Q. -- in Mr. Gareis's surgery?
A. Uh-huh.
Q. But you can see that it sits on a cart.
A. Correct.
Q. Do you have any knowledge of where the Bair Hugger 505 was positioned relative to the floor during Mr. Gareis's surgery?
A. No clue.
Q. Okay. But in the model for the 505, the Bair Hugger is placed close to the floor; correct?
A. Correct. The suction.
Q. The suction is close to the floor?
A. Yes.
Q. Okay. In other words, it's within a couple of inches from the floor; true?
A. Yes.

Q. Okay.
A. Yes.
MR. ASSAAD: Could we go off the record real quick?
MR. GOSS: Sure.
(Recess.)
THE VIDEOGRAPHER: Back on video at 5:12 p.m.
(Exhibit 14 marked.)
BY MR. GOSS:
Q. Okay. So Exhibit 14 --
A. Can I ask a question?
Q. Yes, you may.
A. You're showing me pictures of devices in an OR.
Q. Yes, sir.
A. And I can understand what they -- what they do. Why are you showing it to me?
Q. Well, I -- I will ask a question and maybe it will become clearer.
A. Okay.
Q. Okay.
A. Okay.
MR. ASSAAD: I'll say same objection with respect to these photos as well. Lack of

foundation.
MR. GOSS: Understood.
BY MR. GOSS:
Q. The equipment shown in this exhibit, at least -- so on the first page, you can see a machine in the center that I will represent to you is an anesthesia machine.
A. Okay.
Q. And then to the left, there is a monitor; correct?
A. Yes.
Q. Okay. And then if you look towards the lower left, there's a clear plastic cylinder that I will represent to you is a Bellows check document.
A. Yes.
Q. Okay? Would you agree with me that none of this equipment is included in the model for the 505?
MR. ASSAAD: Objection to form.
THE WITNESS: Neither 750 or 5- -- it was it was written in the report. It says we did not account for extra things or -- because this is an infinite process.
BY MR. GOSS:
Q. I understand.

A. There are many operating rooms every -- they are so different.
Q. And -- and the model for the 505 was not tailored to this specific set of conditions; correct?
A. Correct.
Q. And the model can only predict, predict based on what's in the model?
MR. ASSAAD: Objection to form.
THE WITNESS: Except if these input power are far away from the location of the drape and the power is not an oven.
BY MR. GOSS:
Q. Okay.
A. So you can make always qualifi- -- qualification, yes.
Q. Okay. So if you look on the second page, it's somewhat difficult to see. But towards the bottom on the back side of this anesthesia machine, there is a grille.
A. Yes.
Q. Okay. Would that indicate to you that during operation, that machine also generates heat?
MR. ASSAAD: Objection to form.
THE WITNESS: It's obvious, yes.

BY MR. GOSS:
Q. Okay. We don't know how much heat; correct?
A. That's the whole thing.
Q. Okay. And as with the electric coterie machine, sitting here today, we don't know how much heat is coming out of that box; correct?
MR. ASSAAD: Objection to form.
THE WITNESS: Okay.
BY MR. GOSS:
Q. Okay. But what we do know is that whatever heat is coming out of these machines is not in the 505 CFD; correct?
MR. ASSAAD: Objection to form.
THE WITNESS: That statement was written in the report and the paper, always.
BY MR. GOSS:
Q. Okay. If this clear cylinder Bellows, if it's releasing air during operation, that also is not part of the model; correct?
MR. ASSAAD: Objection to form.
THE WITNESS: Yes. Neither the motion of people in the operating room or many other things.
BY MR. GOSS:
Q. Okay. The model for the 505, is it --

is it your testimony that the CFD model for the 505 predicts the pathways of Squame particles as depicted in the model?
MR. ASSAAD: Objection to form.
THE WITNESS: It did -- it does and did, yeah.
BY MR. GOSS:
Q. Okay. For what period of time is it predictive of those Squame particles?
MR. ASSAAD: Objection to form.
THE WITNESS: I don't understand the question. We -- we have a graph that shows time when things are picked up at a given location. They are in the report.
BY MR. GOSS:
Q. Okay. If you were to continue to run the model for a longer time, would it still be predictive?
A. Definitely.
Q. Okay. Does the predictive power of the model continue indefinitely?
MR. ASSAAD: Objection to form.
THE WITNESS: Absolutely. When you have infinite amount of super computer time, yes.

BY MR. GOSS:
Q. Okay.
A. No degradation in the quality. It's the same equation, same boundary condition. It goes forever.
Q. Are CFD models used in weather forecasts?
A. Yes. And I can give you a lecture for one hour on that, if you want to.
Q. Okay.
A. That's why they never give you anything with after six hours from the prediction.
Q. Okay. So you would only trust the weather forecast for about six hours; is that right?
A. Sometimes four hours, depending on the location, if you're on a mountain or desert, yeah.
Q. Okay.
A. And the reason is they don't have initial conditions, initial conditions over a fine mesh. The mesh is 10 miles -- 25 miles. And I was in a meeting they want to reduce it to 5 miles.
Q. Okay.
A. Think of that.
Q. So the mesh is very coarse.
A. Very coarse. We call it rubbish compared to this. That's what the -- what the forecast.

Q. Okay.
A. Yes.
Q. And you don't have initial conditions --
A. Yes.
Q. -- correct?
When you say "initial conditions," are we referring to boundary conditions?
A. Both -- different. One in time at 6:00 o'clock in the morning give me all the boundary conditions in Irvine or in Chicago.
Q. Okay.
A. If you don't have then everything is all gas.
Q. Okay. And so am I right that the reason that the 505 model is infinitely predictive with no degradation is that you have specified the initial conditions?
A. And boundary conditions.
Q. And boundary conditions?
A. Correct.
Q. Okay.
A. The initial condition is related to your previous good question why it goes down. If I had put 10 million Squames, that would not happen at that time so that's initial condition.

Q. That would happen at a different time?
A. Different, later time, yes.
Q. Would you agree with me, after having seen the photographs of the operating room and after having reviewed the drawing of the ceiling vents, that the 505 model cannot predict the movement of squames in that room that would have occurred on November 9th, 2010?
MR. ASSAAD: Objection to form.
THE WITNESS: I don't agree with you.
BY MR. GOSS:
Q. Okay.
A. I don't agree with you.
Q. So it's your testimony that the 505 model will predict the movement of Squames in that operating room on November 9th, 2010?
MR. ASSAAD: Objection to form.
THE WITNESS: I do not know why the date is.
BY MR. GOSS:
Q. It was the date of the surgery.
A. Oh, I have no clue. I have no clue. And I'm saying in the geometry I used -- I'll give you a good idea.
In order to see the difference between

750 and 505, you -- you cannot change anything in the room except the flow rate and the temperature.
Q. Okay.
A. If you want to learn. But if you want to just give color graphics, put so much junk in the room and say, here is a 505. You cannot learn anything.
Q. Okay.
A. This one tells you the difference is time.
Q. Okay. I understand how you identified the difference between the 750 and the 5- --
A. Correct.
Q. -- -05?
What I'm asking is: The 505 did not model the particulars of this room; correct?
A. Correct.
Q. Okay.
A. As you can see.
Q. So it would not be -- it would not be able to predict the movement of a Squame within this room?
MR. ASSAAD: Objection to form.
THE WITNESS: It will predict the movement of the Squames in that room without accounting for the effect of these things.

BY MR. GOSS:
Q. Okay. Would you with agree with me that if you were to change the physical ingredients of the model you would have to do a new validation?
MR. ASSAAD: Objection to form.
THE WITNESS: Explain physical ingredients size of room or explain in detail, please.
BY MR. GOSS:
Q. So the equipment in the room. If you were to change the equipment in the room, would you then need -- would you consider the equipment to be a physical ingredient?
MR. ASSAAD: Objection to form.
THE WITNESS: I will call just equipment. If it's equipment I call it equipment.
BY MR. GOSS:
Q. Okay.
A. If you put more equipment in the room and you want to get the details of everything, you have to do a new CAD and new --
Q. Okay.
A. -- everything to do it. Definitely.
Q. I want to make sure I understand if it's a term of art.
Does the term or phrase physical

ingredients have a particular meaning in the field of fluid dynamics?
A. No.
Q. Okay. Do you consider any large eddy simulation with particles to be suspect?
MR. ASSAAD: Objection to form.
THE WITNESS: I would say the following: Large eddy simulation, if done -- if it is done correctly, it is the only method available today in the world to do practical flows. Okay? It's the only one. I can give you the different options with different prices; right? You probably know already; right?
RANS, you pay a dollar, and you get junk.
BY MR. GOSS:
Q. Okay.
A. Ansys, you pay $2, and you get more junk. Good check check, you get -- the best thing you can get in the world today. And you have an infinite super computer, what is called DNS, there would be no modeling. That would be the best. But there is no computer today in China or America that can do that.
Q. For an operating room?
A. For an operating -- it's called a practical

flow. Yes. Yes.
Q. And DNS is direct --
A. Numerical.
Q. -- numerical --
A. You don't -- you don't -- oh, sorry.
Q. To make sure, it's -- and this is your expertise is a direct numerical --
A. Right.
Q. -- simulation; correct?
MR. ASSAAD: Objection to form.
THE WITNESS: DNS is done to explain physics that is needed for large large eddy simulation in order to validate LES you have to validate DNS.
BY MR. GOSS:
Q. Okay.
A. If you don't have DNS you cannot validate so this LES code is used here has been validated with Stanford at DNS at Stanford.
Q. Okay.
A. So DNS is an essential thing for life. LES is doable for large room or something.
Q. Did you say DNS is essential for life?
A. Yes. To do everything, because we do it for medical.
Q. Oh, I see.

A. Yeah, if you want to do some accuracy --
Q. Okay.
A. -- in an operation.
Q. But as you testified, there is no DNS -- there's no computer that can actually do a DNS of an operating room?
A. That's why I asked for PIV. That's alternative is to get PIV for $2 million.
Q. And that is particle image V?
A. Correct.
Q. All right. So do you disagree -- do you disagree with the statement that in any large eddy simulation with particles is suspect?
MR. ASSAAD: Objection to form.
BY MR. GOSS:
Q. Do you disagree with that statement?
MR. ASSAAD: Objection to form.
THE WITNESS: LES is part of suspect if it is not done correctly. I would say that word -- statement.
MR. GOSS: I think I'm finished, but I want to talk to Mr. Gordon briefly --
MR. GOSS: Sure.
MR. GOSS: -- before we transition to Mr. Assaad.

THE WITNESS: Okay.
MR. GOSS: Okay.
THE WITNESS: Off --
MR. ASSAAD:
THE VIDEOGRAPHER: Off video, 5:27 p.m.
(Recess.)
THE VIDEOGRAPHER: Back on video at 5:34 p.m.

EXAMINATION

BY MR. ASSAAD:

Q. I know it's late. I'm going to try to be quick, Dr. Elghobashi. But before I ask you any questions, I'm going to go ahead and mark the easel documents as exhibits. So I'm doing that right now. I'll need seven exhibit stickers.

MS. ZIMMERMAN: You can do one.

MR. ASSAAD: No. I'm doing seven.

Thank you. So just for the record, the drawn notes that Dr. Elghobashi did during his deposition will be marked 15 through 21. Correction. 15 through 20.

(Exhibits 15 through 20 marked.)

BY MR. ASSAAD:

Q. And I just have a couple questions with

respect to just to follow up on defendant's questions.

During Mr. Goss's questioning, he asked with respect to whether or not the patient position, if he's laying on the side or on the back, would have an effect on the results of the CFD modeling.

Does the position of the patient -- will that have an effect on the results and whether or not the Squames reach the surgical table and the surgical site?

A. If the patient is covered with a drape and all the cubic feet per minute leave the drape edge, it doesn't matter what's happening under the drape, whether lying this way or that way. It doesn't matter.

Q. Okay. So the results would be the same?

A. Yes. The flow rate, the same. The temperature coming out, correct.

Q. Okay. And if the flow rate changes by like 1 or 2 percent or 5 percent as a result of Blair blanket being tucked underneath the patient. Would that make a significant difference with respect to the results?

A. If the flow rate was reduced by 5 percent, it will take a few more seconds to reach the same

conclusion.

Q. So it only would affect the time but very minimally; correct?

A. Correct.

MR. GOSS: Objection. Leading.

BY MR. ASSAAD:

Q. Now, I'd like to talk about the standard code. It's my understanding that in your report, as well as your published paper, that all the information anyone needs, such as yourself or someone in the field of computational fluid dynamics to replicate your results; is that correct?

MR. GOSS: Objection. Leading.

THE WITNESS: So the report has all the boundary and initial conditions. And the mesh -- very important, the mesh we put the mesh in. So a person who knows how to do large eddy simulation can use the equation, same mesh, same initial condition, same boundary condition. And if his code is correct, accurate, he will get the same result.

BY MR. ASSAAD:

Q. When you talk about the code, would it have to be the Stanford code?

A. No.

Q. What do you mean by that?

A. There are many large-eddy simulation codes around the world in all good universities where they do research on turbulence, Stanford University of California, Johns Hopkins, Cornell, Switzerland, France, large eddy simulation equations have been known since the 1972, back 14-some years.

So we wrote these equations in the paper they are available in books and papers. You need a Ph.D. student who is trained under a knowledgeable professor, then you can reproduce the same results.

Q. And --

A. And there are no secrets in that.

Q. And there have been DHE students that have been training under professors for 20 years; correct?

A. Yeah, from 1972.

Q. Okay. So --

A. Hundreds.

Q. So there's hundreds of people around the country or in the world that could --

A. Sure.

Q. -- take -- take your -- your report and replicate it using any -- any one of the codes that are available?

A. Absolutely, if they have access to a super

computer.
Q. Okay.
A. And super computers are accessible only to people who are qualified to use them, not everybody.
Q. Okay. And I take it that the University of Minnesota has their own code that is based -- that -- that could solve the --
A. Yes.
Q. -- problems; correct?
A. Yes.
MR. GOSS: Objection. Leading.
BY MR. ASSAAD:
Q. Go on.
A. Yes.
Q. And I take it that Ph.D. students that work under someone such as M or Dr. Apte check check are allowed to take the code and use it in their research later on?
A. Correct. After a Ph.D. student expenses five years with a professor, starting from code A, you do some -- some modification to give his Ph.D. research. He can take that code to go to his own university or somewhere to continue it. That's how we train Ph.D. students. It takes five years, six years.

Q. Okay.
A. Yeah.
Q. So you have to be trained for many years to use the code; correct?
A. It takes about five years.
Q. Okay. So someone that has never used the Code before, can they come and use it with a tutorial in 15 minutes?
MR. GOSS: Objection to form.
THE WITNESS: No. Absolutely not.
BY MR. ASSAAD:
Q. For example, your DNS code, how long does it take for someone to train and be able to use it where you would trust them to send something to a super computer for the result?
A. 24 months.
Q. Okay.
MR. ASSAAD: That's all I have.
THE WITNESS: Okay. You it.
MR. GOSS: Just a brief follow-up.

FURTHER EXAMINATION
BY MR. GOSS:
Q. Why did you choose the standard -- choose to partner with a researcher who uses the Stanford

code?
A. Okay. Stanford has something called turbulence research center. It is the best center in the world, period. They have a lot of funds to hire graduate students. And mainly NASA Ames is across the street in the Bay.
So collaboration between NASA Ames, they need the results. So most of the patients are funded by NASA. That's a unique situation.
Q. NASA --
A. Ames, A-m-e-s. That's in the Bay Area.
And M was the employee that NASA and before he went to Stanford. And so continued. That's the history. And because I know the Stanford group for many years, and they have the best Codes in that area.
Q. So better than other available codes?
A. I think so, because I know what they produced over the years. They have a large number -- remember, you asked about validation. When you have 30 students running the code for five years, you tell them validate, validate. Validation is the name of the game here. You cannot just do -- so if you have 40 students for five years. That's 200 many years validation. If

you go to another university, they just started they spend 10 years or something. So it's --
Q. It's like wine. It improves with time?
A. Absolutely. Absolutely. Absolutely.
When I went to school at Imperial College in London, we were 35 people working with a great professor, who passed away now. And as of that time Imperial College -- I was offered the position at Stanford, but the people in -- at USC and other -- they told me to go to London because this is the guy.
So I went to him only because, you know, the reputation. So people around, they know Imperial College they know Stanford. That's all.
Q. Well, as a graduate as a University of California, I'm glad you didn't go to Stanford?
MR. GOSS: That's all I have.
THE WITNESS: Where did you go?
MR. GOSS: Berkeley.
THE WITNESS: Okay.
MR. ASSAAD: A couple follow-up.
A. Yes.

FURTHER EXAMINATION
BY MR. ASSAAD:

Q. You're talking about the -- the problem that you were solve here is not a complex problem in your field of --

A. No.

Q. -- correct?

A. Not at all, no.

Q. So I understand that the Stanford code is heavily validated, but there are many codes out there that could solve the problem because it's not as complex as what the students at Stanford do; correct?

A. Correct. Because the number of years, number of student hours spanned since the 1980s -- yeah. Since 1985. So 30-some years. Multiply 30 years by validation and have so many papers. That's --

Q. And all those people that have been there for 30 years have access to the Stanford code; correct?

A. Right. Different versions when you start with the code you're solving, say, flow inside a shut engine then you -- that you graduated and you go to another university. And they are working on the wind turbines. So the guy in Johns Hopkins has the same code, but he applies the wind turbines.

The guy in Minnesota propeller in a submarine.

So we all -- it's a code, but then you have to work another five years to make it fit into that. But the equation is the same. The algorithms are the same.

Q. Okay. So there's many versions of the Stanford code outside of what F has or M has?

A. Correct.

MR. ASSAAD: Okay. That's all I have.

MR. GOSS: Thank you.

MR. ASSAAD: Thank you.

THE REPORTER:

MR. ASSAAD: Read and sign. Sorry.

THE REPORTER: Who needs a rough?

MR. ASSAAD: Yes. We need a rough.

MR. GOSS: Okay. Yeah.

THE VIDEOGRAPHER: This concludes today's deposition at 5:47.

Gauss
Ansys

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